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Indexed in the Industrial Arts Index. Pub-
lished every Thursday. Subscription Price
North America, South America and U. S.
Possessions, \$8; Foreign, \$15 a year.
Single Copy, 35 cents.

Cable Address, "Ironage" N. Y.

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This Week in The IRON AGE

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March 8, 1945

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By J. H. Van Deventer 55

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The IRON AGE

ESTABLISHED 1885

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March 8, 1945

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REMINISCENCE

CONVALESCING in Atlantic City sunshine after what has apparently been a successful bout with pneumococcus and having not much else to think about, one's mind turns to reminiscence. Normally you do not get time for that.

So I have been thinking about shop experiences of 40 years ago and of what we do and have in our industrial plants of today that we did not then.

In those days, which do not seem so long ago, aside from a few special tool steels, we knew no alloy steels. There were just two kinds of steels that we encountered in the day's work: low-carbon and high-carbon. We did not even call them that but recognized them as soft or hard. The soft steel was what we made things of; the hard steel was what we made them with.

Choosing the hard or tool steel to be used in the shop was quite a job in those days. There were dozens of supposedly different brands on the market and an eloquent super-salesman to represent each one. I do not recollect that any of these steels were copper-bearing but their salesmen certainly had plenty of brass in their make-up.

Lacking any scientific means of checking these various claims, we would hold a cutting tool competition once a year. A number of these tool steel salesmen would be invited to bring samples of their wares and pit them against the other fellows'. A shaft forging would be put between centers in a lathe; speed, feed and depth of cut chosen and the tool that lasted the longest got the business. Unfortunately, future shipments did not always live up to the sample. But it was fun anyway and we needed a little of that to break the monotony of the 10-hour day, 60-hour week.

Oil salesmen, particularly those who sold cutting oils, were in the same category. Very few plants indeed, in those days, had testing laboratories and selection was largely a foreman's choice and a matter of opinion, plus sometimes the passing of a ten dollar bill from one hand to another.

Shop life in those days had its drawbacks but there were compensating advantages. Plants were smaller for one thing and more personalized. By and large, in spite of long hours and smaller pay I think that the people in them were more contented than the workers of today. Maybe they did not have as much time to think about their troubles. Or perhaps it was because the art of trouble making had not as yet been developed.

J. H. Van Deventer



Finer Things **Are Coming Out of the Ground**

From the ore ranges, the coal fields, and the limestone beds are coming vast quantities of blended iron ore, coking coal, and purest limestone—the principal ingredients for making steel, the “master metal” in both peace and war.

Today this steel must all go into the production of the materiel of war, but tomorrow, when Victory is ours, finer things will come to us from out of the ground because of improvements now being made in steel

Inland metallurgists are constantly testing and re-testing, melting and re-melting, adding one element and taking away another—always seeking for something better. Already they have contributed many new methods and new steels to production for war.

These, and the newer methods and Inland steels that are sure to come from continued intensive research, will help you meet the needs of America at peace.



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► The War Department announced this week the existence of the P-80 "Shooting Star", single engine jet plane designed by Lockheed, and powered by a General Electric gas turbine engine, presumed to have gone into combat. It is in production in four plants, is the combat hope of the AAF for this war.

► Strength of the international aluminum cartel is of interest to the Senate's Small Business Committee, in connection with the light metals hearings. Particular attention is being paid to Alcoa's alleged connection with it in past years through the Aluminum Co. of Canada.

Attention is being paid to light metals fabricators' demands that competition for Alcoa be fostered by the government. The Canadian enterprise, financed largely by RFC, now equipped with its own power to produce aluminum cheaper than anyone else in the world, hangs heavily over the postwar head of the industry in this country.

► Steel, plywood, and aluminum tents are now being manufactured experimentally for the Army, and if successful, may importantly change the market situation in any one of those fields.

► Abandonment of all or part of the Alcan highway is imminent, according to reports, reflecting the extensive maintenance required to keep it open, and the reversed tactical situation in Alaska and the Aleutians.

► The Engineer's Corps' new aluminum bridge may be Eisenhower's ace-in-the-hole for the Rhine crossings. Designed for speedy erection in swift currents, they would be used for the establishment of bridgeheads, replaced later by Bailey type structures.

► Failure of the Seattle-Renton Boeing plants to meet production schedules on the B-29 program has brought WPB Chief Krug to the scene. Labor turnover is believed to be the chief trouble. Boeing has been hiring 3000 new workers monthly while an average of 2500 a month have been quitting.

► All-ceramic gas burners utilizing carbureted gas-air mixtures at higher than normal pressures has made possible large heat releases in small burner concavities. The combustion reaction is confined within the burner itself so that no flame as such exists in the heating chamber beyond the face of the burner block.

These ceramic burners make possible the use of continuous compact heat-treating machines that are clean and occupy very little floor space.

► Tests on SAE X4130, 4140 and X4340 show that there is a straight line relationship between resistance to impact and hardness. These tests also lead to the conclusion that if any low alloy steel in this classification is heat treated to a certain hardness or tensile strength, approximately the same Izod impact resistance value will be obtained regardless of the alloying elements present in the steel.

Impact resistance values of salt quenched materials were also shown to be higher than those of corresponding oil quenched specimens.

► Because Sweden no longer receives imports of German iron and steel, it has had to divert high grade steel facilities to the production of commercial grades. Commercial steel now constitutes about 50 per cent of total output, while in prewar years, production of high grade steel exceeded that of commercial grades.

Plans to increase Swedish production of iron and steel are complicated by limited supplies of scrap iron and coke. If imports of coal and coke cannot be resumed during the period July 1, 1945, to July 1, 1946, domestic charcoal will have to be used as much as possible in the blast furnaces.

► Army Ordnance losses since D-Day in the European theater of operations for both Army Groups have recently been estimated as 6205 combat vehicles, 34,250 general purpose vehicles, 166,885 rifles and other small arms, 23,871 mortars and machine guns and 75,245 binoculars, watches and compasses.

Enemy equipment reportedly captured or destroyed far exceeds total U. S. battle losses. For example, according to Ordnance reports, the Third Army has reported about twice as many Panzer tanks captured or known to have been destroyed as their own battle losses. In addition, General Patton's report that they have destroyed or captured 17 pieces of enemy artillery for every one lost.

Continuous Heat Treatment

. . . The development of all-ceramic burners handling high-pressure carbureted gas-air-mixtures has opened new vistas in heat treatment. High speed, automatic continuous units, clean and very compact, are being developed for bar and strip stock in both ferrous and non-ferrous industries.

By HARRY W. SMITH, Jr.
Selas Corp. of America, Philadelphia

NEW developments in gas combustion engineering are being eyed with exceptional interest by producers and users of rod, tube, bar, and strip—both ferrous and non-ferrous—because it is not without possibility that many fundamental concepts of heat processing in this field are in for revision.

For one thing, continuous heat

treatment through small units, which more closely resemble machine tools than furnaces, promises to supplant much batch treatment in large heavy car-hearth, conveyor, bell or pan-type equipment—an end desirable from the standpoints of both floor space and smooth efficient routing of production.

For another, rates of heat transfer into work have been so accelerated

that the times during which metals are under heat can be cut and cut again—and the deleterious effects of time-at-temperature (such as scaling, decarburization, dezincing, etc.) can be minimized.

Finally, it is possible to construct “hell-holes” for continuous heat treatment of sufficient capacity to handle considerable tonnages of stock in single-line transit (length after length in endless procession) and insure that each length (of rod, for example) transverses the same path at the same speed through the same hell-hole—to undergo the same heat treatment, inch-by-inch along its length and rod-by-rod throughout the production run. Also, continuous spray quenching on the fly—for purposes of hardening, preventing oxidation, stopping phase precipitation, or simple cooling—becomes convenient without large tanks, hoists, and handling machinery.

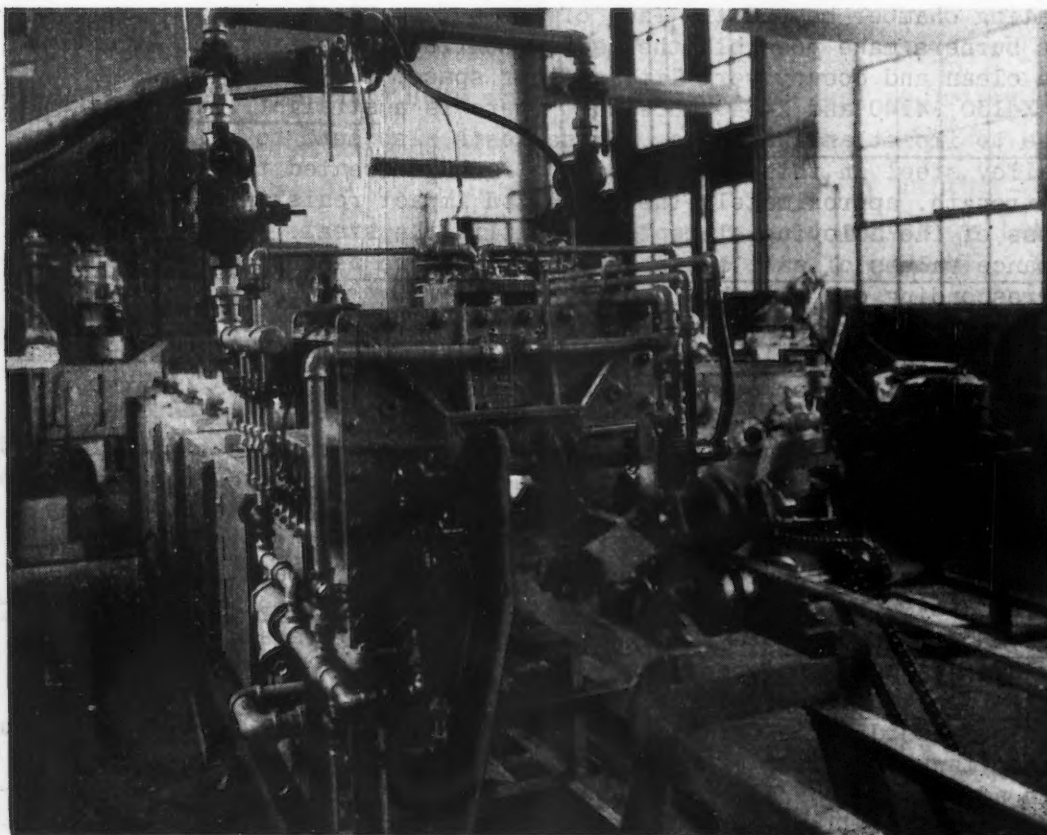


FIG. 1—Ten-burner unit for continuous heat treatment of stainless steel tubing at 5.3 ft. per hr.



FIG. 2—Structure of stainless steel tubing at 250 diameters. Before heat treatment, at left, showing the results of cold work; after heat treatment, at right, showing annealed structure. Etched in aqua regia.

Already the new heating techniques which promise such evolutions are being applied: (1) to the annealing of cold rolled rod and bar, welded tubing, seamless tubing, extruded nonferrous materials, and finned stainless steel tubes; (2) to the hardening of pre-heat-treated stock; and (3) to the brightening of electrodeposited tin on steel strip.

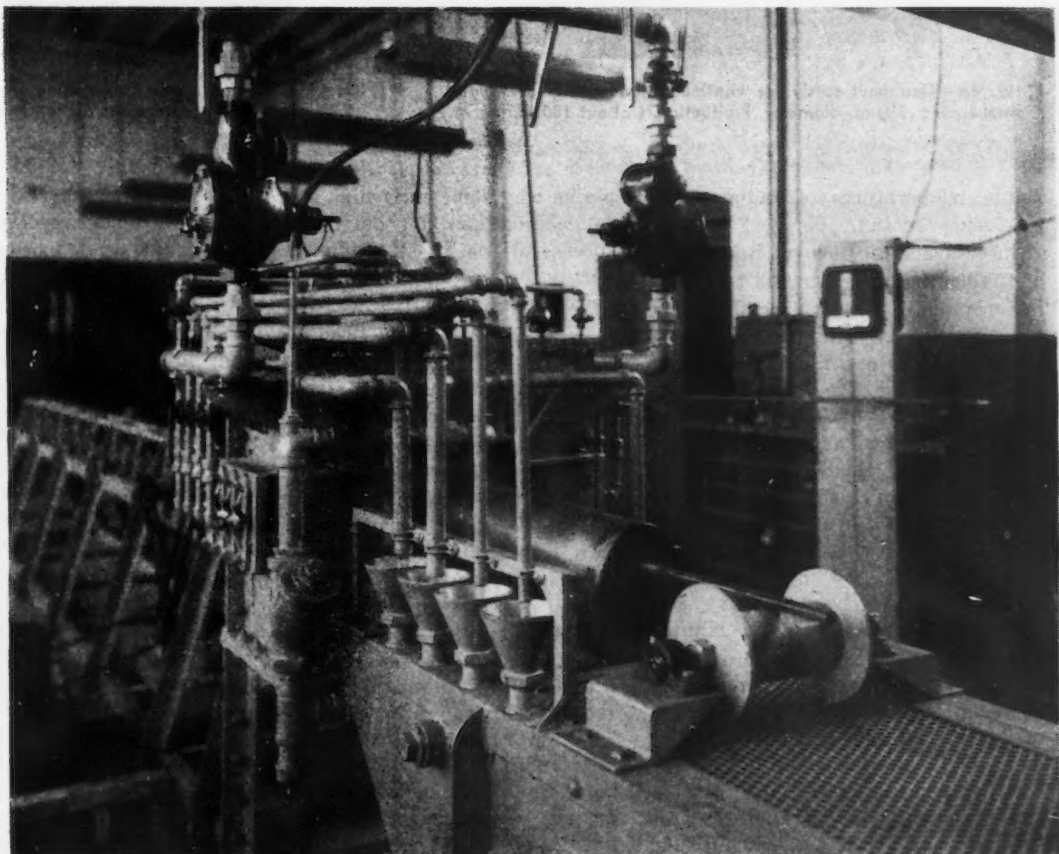
The combustion engineering de-

velopment itself hinges about the use of all-ceramic gas burners utilizing completely and accurately carburized gas-air-mixture supplies at higher than normal pressures. In such burners it is possible to obtain large heat releases in small burner concavities, through employment of the insulating and refractory qualities of ceramics to insure completion of the combustion reaction within the confines of the

burner itself, so that no flame (as such) exists in the heating chamber beyond the face of the burner block.

As applied to a high speed heating cell through which rods, bars, or tubing are processed, the construction involves many such burners crowded as closely as possible around a horizontal cylindrical chamber from 3 in. to 8 in. in diameter and as long as required for the heating effect desired

FIG. 3—Outlet end of continuous unit for stainless steel, showing housing around the quenching unit.



(13 in. to 8 ft. in units so far designed). Thus, an immense heat release closely fitted about the traveling work piece is attained, and the "thermal head" (or temperature differential) between the walls of the heating cell and the surface of the work is significantly multiplied. In some instances the internal cell temperature is as high as 3100 deg. F.

The great acceleration of heating rates procurable with such a construction can be attributed to two effects: First, the above mentioned higher thermal head, and the greater rate of *radiant* heat transfer associated therewith (proportional to the difference between the fourth powers of the ab-

convected components of heat transfer being greatly accelerated over normal furnace methods.

All-Ceramic Burners

Obviously, such highly compacted and intensified combustion would fuse metal burner constructions, and, indeed, the work itself if it were to stop or slow down unduly. Therefore, the developments under discussion have had to await the perfection of specialized all-ceramic burner designs—involving the invention of techniques of molding and firing close-tolerance ceramic parts of great complexity and varied composition. This factor, probably more than any other, ex-

ceeds 20 ft. lengths per hr.). Tonnage amounts to 160 lb. per hr. The heat treatment is at 2150 deg. F. and is followed by a precision spray quench of water and a short flood-cooling run immediately beyond the cell. The metallurgical structures before and after annealing are shown in Fig. 2. Hardness was reduced to 62-65 Rockwell B, 7 to 8 points softer than required.

The outlet side of the cell (showing the housing around the quenching unit, and the air gaps in the four drain lines from the water-cooled feed rollers and end-plate castings) is central in Fig. 3. The run-out table, on which convenient rollers are

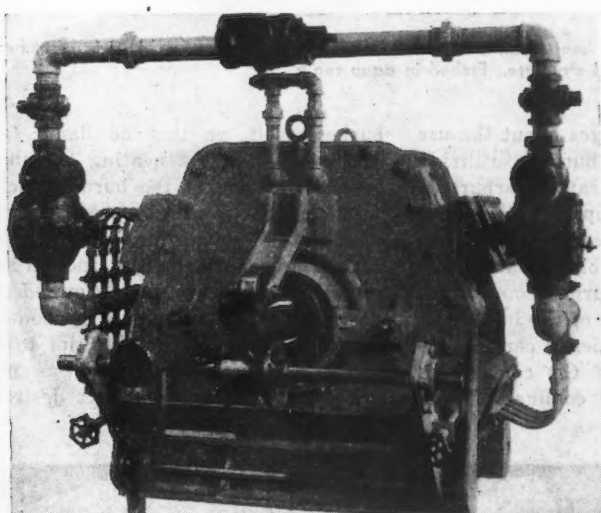


FIG. 4A—Doughnut spray for continuous quenching of welded steel tubing, 3½-in. diameter. Production is about 180 lb. per hr.

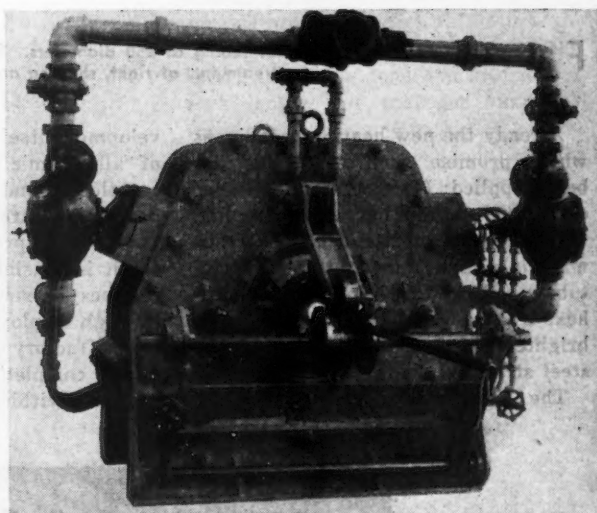


FIG. 4B—Doughnut spray for continuous quenching welded steel tubing of diameters up to an inch or so.

solute temperatures of radiator and receiver); second, the very greatly reduced space between the inner walls of the heating chamber and the work, in contradistinction to normal furnace practice. As a result, the products of combustion whip through the cell to flue at very much greater lineal velocities (for roughly the same volume of fuel is burned as in conventional practice, but must be discharged through very much smaller passages). Thus, the rate of heat transfer to the work by *convection* (proportional to the speed of the hot convection medium past the heat-receiving surface) is also multiplied importantly.

As applied to the heat processing of strip, burner arrangements are, of course, not cylindrical, but in the form of facing flat panels, closely spaced on either side of the traveling strip. The characteristics of the heating process are the same as in rod or tube heating, both the radiant and

plains why sufficiently high speed gas combustion has not heretofore been successful—despite the admitted production, metallurgical, and economic advantages of progressive heat treatment through small combustion units.

Actual calculations, designs, and equipment may help to interpret the new techniques in terms of rod, tube and strip production.

In the installation shown in Fig. 1 the heating cell is 13 in. long by 3¼ in. square, centrally located through a unit only 30 in. by 30 in. by 24 in. thick overall. Ten radiant-ceramic-cup burners fire into the cell from the top, bottom and sides, and liberate within the cell no less than 300,000 B.t.u. per hr., tantamount to 4 million B.t.u. per hr. per cu. ft. of cell volume. Through this cell passes stainless steel tubing of ¾ in. o.d. and ½ in. bore, finned to a depth of 1/16 in., during continuous transport at a lineal rate of 5.3 ft. per min. (six-

mounted, serves also as a large and convenient reservoir for quench water.

Prior to service in producing the finned stainless tubing, this unit was tested also for the continuous annealing of ¾ in. diameter and 1 in. diameter tellurium-nickel-brass rods at a temperature of 1550 deg. F. and lineal transport speeds of 27 in. per min. and 23 in. per min., respectively—the hardness results being B10-12 Rockwell B uniformly along the 20 ft. lengths, across cut sections of the stock, and from rod to rod.

The unit shown in Figs. 4A and 4B is similar, with a cell shape 7 in. in diameter by 13 in. long, so as to accommodate various sizes of welded steel tubing from 5/16 in. diameter up to 3½ in. diameter. Speeds of tube travel through the unit vary from 2/3 ft. per min. to 5 ft. per min. (97 sec. down to 13 sec. time-under-heat for any particular section of metal), depending, not on tube diameter, but on

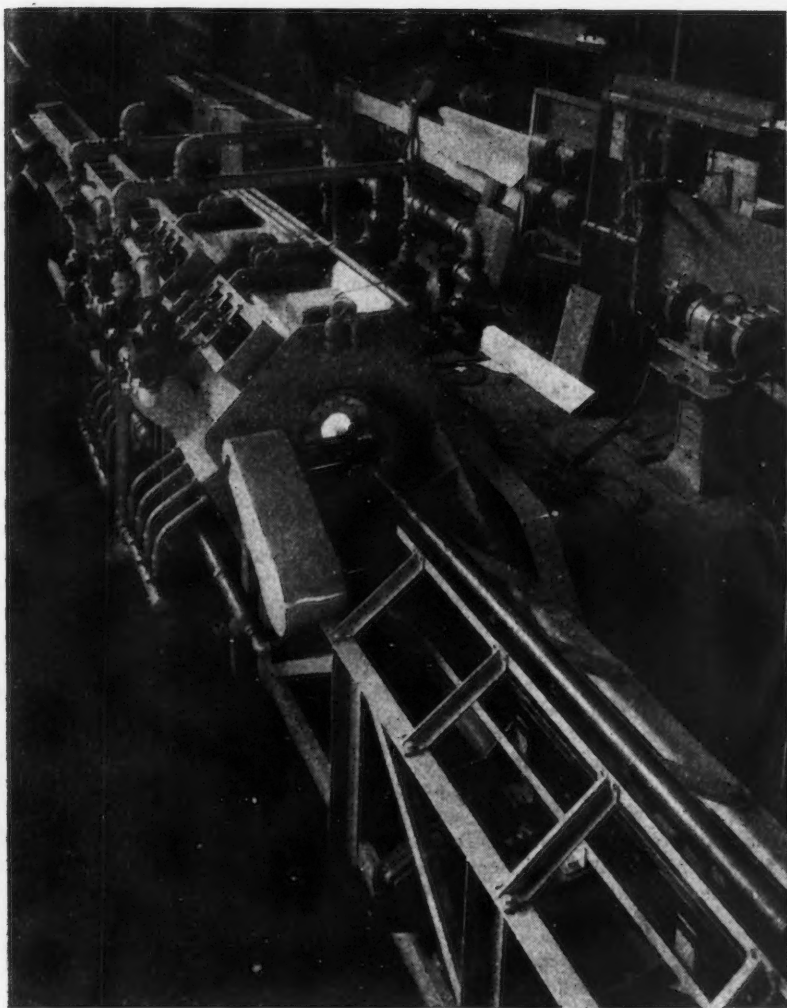


FIG. 5A—Two-cell unit for continuous heat treatment of seamless steel tubing. Total time in unit is $8\frac{1}{2}$ sec. The entire unit is raised and lowered by jacks to accommodate different size tubing.

total metal mass (which follows the product of wall thickness by girth). Fig. 4A shows the precision-drilled bronze quench ring (or doughnut spray) for larger sizes of tubing, while Fig. 4B shows the same for the smaller sizes of tubing. This particular cell is designed for production ranging from 6 lb. per hr. to 180 lb. per hr. at gas consumptions of from 21,000 to 320,000 B.t.u. per hr. Sixteen burners fire into the hell-hole, each with its own shutoff cock (see Fig. 4) so that only a fraction of the total cell capacity need be utilized for processing the small diameter tubes. The design of the unit is such that maximum efficiency and production is attained with tubes of 2 in. to 2½ in. diameter, which is the user's major production requirement. Annealing temperature is approximately 1950 deg. F.

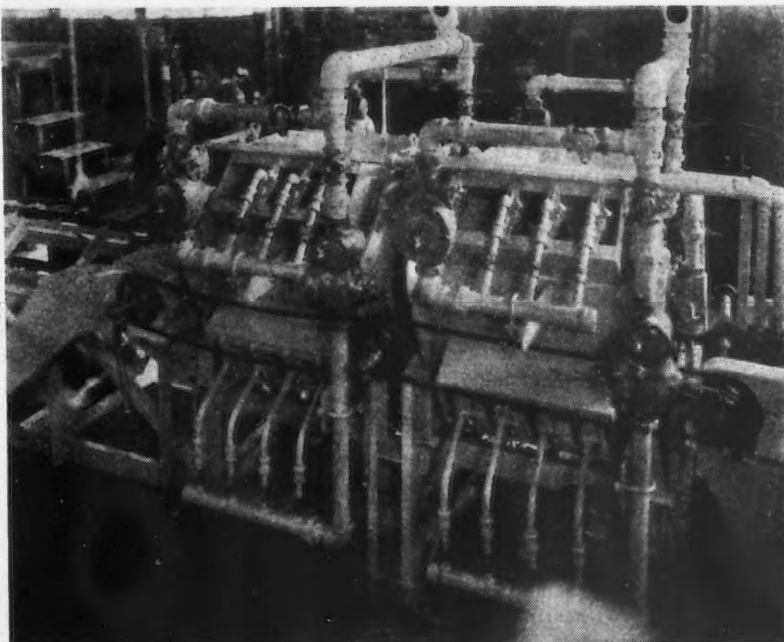
Fig. 5A is of still another unit, for similar but higher production—lineal speeds up to 40 ft. per min. (only 6 sec. heating time, and $8\frac{1}{2}$ sec. total

time in unit). To prevent any sag of tubing during heating, and to keep it centered in the cell at all times, the unit is designed so that two cells, each 23 in. long, are end-to-end with a water-cooled supporting roll between (see Fig. 5B). In this case the entrance unit takes the tubing up to approximately 1100 deg. F. and the exit unit achieves the ultimate 1950 deg. F. required. Here, the tubing is seamless, in a size range from ½ in. to 2½ in. diameter, and quench water is thermostatically controlled at 165 deg. F. Twenty-eight radiant-cup burners, altogether, vent into hell-holes 7 in. in diameter and liberate 2,750,000 B.t.u. per hr. Adjustment for locating tube travel centrally within the hell-holes for different size tubes is by raising or lowering the heating units themselves (by means of jacks incorporated in the structural supports). In the unit shown in Fig. 4A, on the other hand, the heating unit remains stationary and the feed and exit rollers are adjusted instead.

Continuous Nonferrous Unit

Shifting attention from the ferrous to the nonferrous industry, the unit shown in Fig. 6A is interesting. Its cell has an average diameter of 5 in. and is 37 in. long, so long that the two water-cooled supporting rolls must pierce the firing chamber itself (their inlets and bearings being visible just below the nameplate in Fig. 6B). Here bars and rods of various brass and copper alloys, and of diameters from ½ in. to 1½ in., are annealed at rates

FIG. 5B—Same unit as in Fig. 5A, showing the water-cooled supporting roll between the cells, which prevents sag of the tubing and keeps the tubing centered.



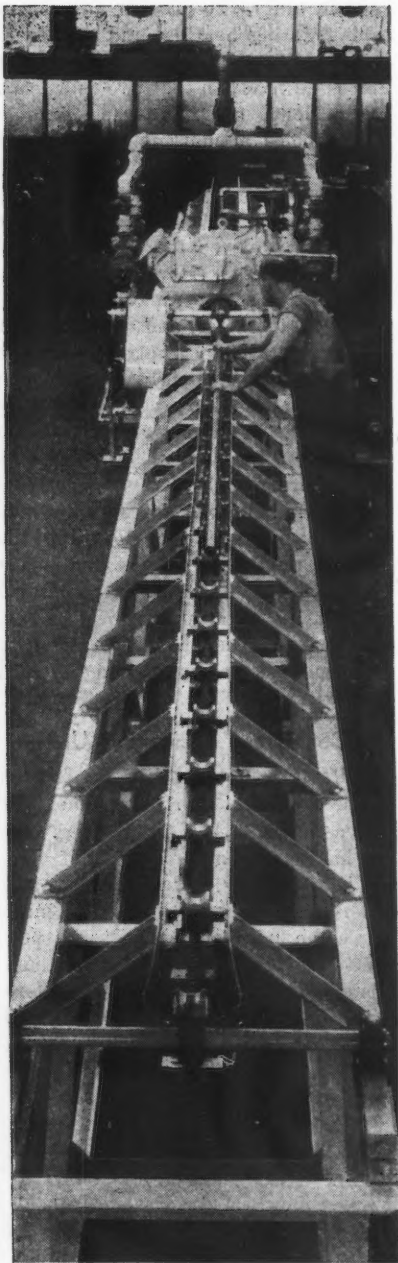


FIG. 6A—Continuous unit for heat treating bars of copper alloys. Bars are from 1/2 to 1 1/2 in. in diameter and are handled at rates up to 23 ft. per min.

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of from 2 ft. per min. to 23 ft. per min. (93 sec. down to 8 sec. time-under-heat). Thirty-two all-ceramic radiant-cup burners liberating 765,000 B.t.u. per hr. are employed. The unit itself is 4 ft. long by 2 1/2 ft. in diameter overall, neglecting feed and run-out tables. The unit is designed for cell temperatures up to 2800 deg. F.—well beyond the melting point of any of the alloys involved—a fundamental conception behind the new class of high speed heating units, and one which emphasizes the necessity

for accurate coordination between precision firing and precision work-feeding rates. The many converging water jets from the doughnut spray ring are clearly visible in Fig. 6B, as is the 18-in. water-flood tunnel just beyond it.

The techniques just described are applicable to any commercial gas—the units shown in Figs. 1, 3 and 4 utilizing manufactured gas of 530 B.t.u. per cu. ft., that in Fig. 5 employing natural gas of 1100 B.t.u. per cu. ft., and that in Fig. 6 operating on propane at 2550 B.t.u. per cu. ft.

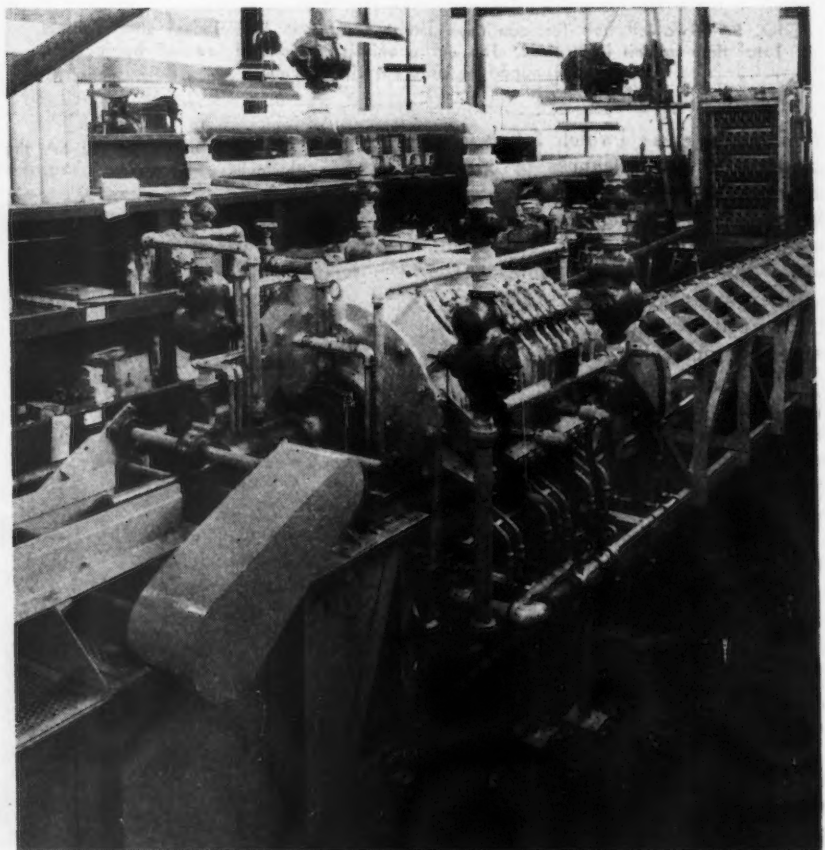
The first application of the latest evolution of such rod heat treatment “on the fly” through compacted-gas-combustion “cells” is still under construction, but is remarkable because it is slated for use in the continuous hardening of pre-heat-treated steel rounds at a rate of 480 lb. per hr. and in sizes of from 3/8 in. diameter to 1 1/2 in. diameter. In this instance two units will be used end-to-end with the spray quench ring in between—the former heating for hardening to 1550 deg. F., and the latter for drawing at 1150 deg. F. Preliminary tests and designs indicate rod speeds of from 1 1/2 ft. per min. to 21 1/2 ft. per min. Each of the two units will have a heat-

ing cell 37 in. long, and be 50 in. long overall. The hell-holes will be roughly rectangular and approximately 5 1/2 in. by 6 1/2 in. Thirty-two burners are being installed in the hardening unit and 20 burners in the drawing unit. A quench ring is being designed with 320 holes of 1/16-in. diameter, a total orifice area of only 0.992 sq. in. (66 per cent of quench-water-line internal cross-sectional area). Adjustable dampers are being provided in the flues of each cell for close regulation of cell pressures. Construction will embody ceramics able to withstand protracted heating at 3000 deg. F.

The operation of this pilot plant will be watched with considerable interest, particularly as regards the time-temperature relationships and metallurgy of the draw operation. There is little doubt about the success of the hardening cycle. If both are successful, an interesting chapter in the production of pre-heat-treated stock may be written.

Developments involving radiant panels, such as shown in Figs. 7A and 7B are yet embryonic—their successful application to date being confined to the flow-brightening of tinplate. The panels shown each employ 75

FIG. 6B—Same unit as in Fig. 6A, showing the two water-cooled supporting rolls which pierce the firing chamber to support and center the rod.



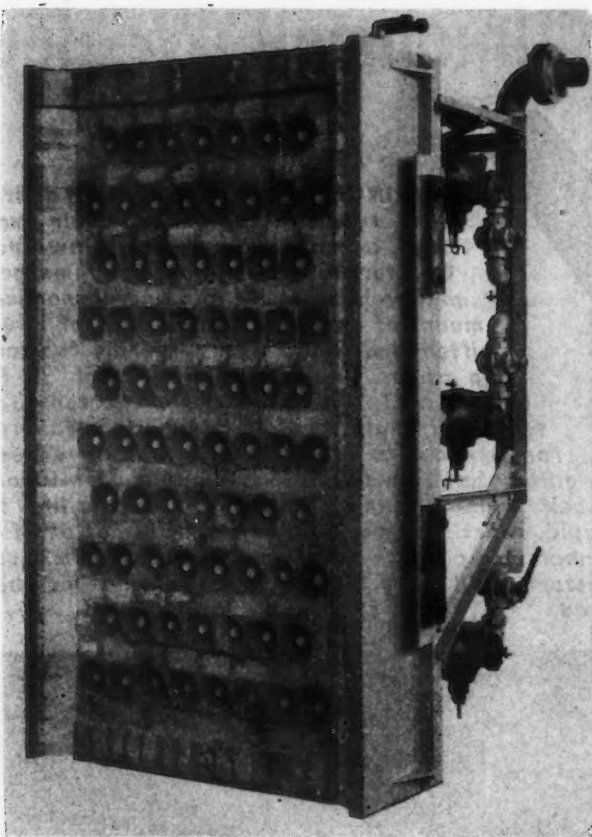


FIG. 7A—Radiant burner panel unit for the flowing of tin on electrolytic tinplate. The burner groups are zoned so that different heat patterns can be used for different strip widths.

closely spaced radiant-cup units in a rectangular arrangement approximately 3 ft. wide by 6 ft. long. Tinplate is processed between these panels at running rates up to 500 ft. per min. It is noteworthy that whole burner groups are zoned, so that different heat patterns can be used for different strip widths. Modulation of the total heating effect of each panel is automatic by motor-driven movement nearer to or further away from the strip. Advantages over electric induction methods are claimed to be: More rapid modulation of heat input with variations in strip or plating thickness, markedly lower installation and operating costs, and higher production speeds.

If such techniques are mentally projected into the fields of continuous strip annealing and finish coating, other startling opportunities suggest themselves. If, further, the possibilities of similar heat transfer are contemplated in terms of heavier work (billet, ingot, bloom, and slab)—where laboratory batch experiment has already demonstrated the feasibility of unusual heating speeds with acceptable temperature uniformities by employing close-fitting envelopes of intensely-fired ceramic burners—the horizons for revolution in rolling mill,

forging, and heavy steel heating seem truly infinite.

Cold Rolling High Strength Steel Strip

THE effect of rolling at temperatures from -298 deg. F. to 392 deg. F. on the tensile properties, deformation, resistance, magnetic properties, tendency to intercrystalline corrosion and structure of strip, 0.088 in. thick, of the following steels:

| | C | Cr | Ni | Mn | Mo |
|----------|------|------|------|------|-----|
| (1) 0.05 | 19.6 | 9.1 | ... | ... | ... |
| (2) 0.06 | 15.4 | 1.4 | 14.5 | ... | ... |
| (3) 0.13 | 15.0 | 1.1 | 16.4 | ... | ... |
| (4) 0.19 | 14.4 | 0.22 | 18.7 | ... | ... |
| (5) 0.57 | 0.7 | ... | 1.0 | ... | ... |
| (6) 0.25 | 0.7 | ... | 1.0 | 0.23 | ... |

is reported by W. Puzicha in *Stahl und Eisen*, 1943, vol. 63, Nov. 25, pp. 853-60; Dec. 2, pp. 880-85.

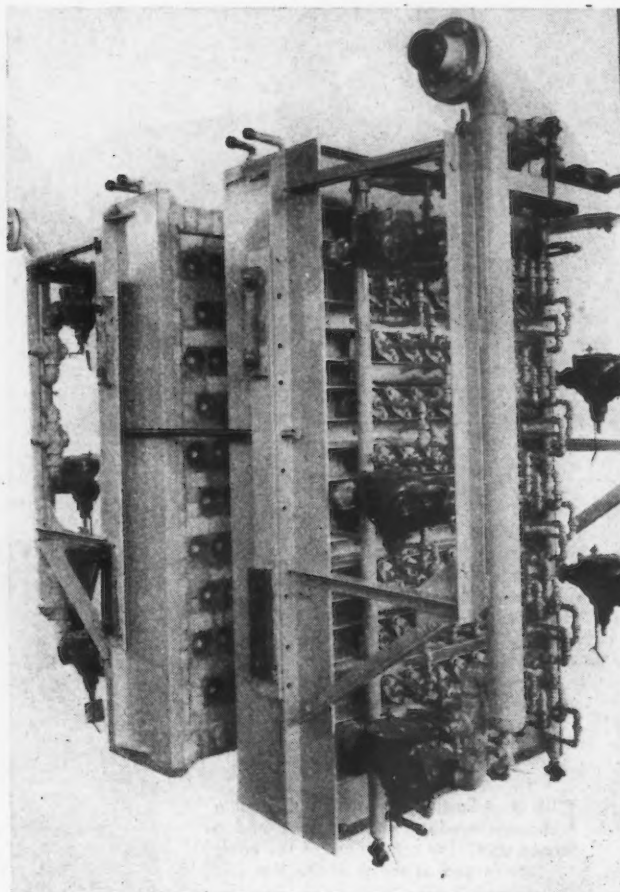
The deformation resistance of the austenitic steels increased sharply with increasing reductions per pass, but this resistance could be reduced with rape oil lubrication. The deformation resistance also increased with decreasing temperature.

Steel (1) attained its maximum tensile strength when reduced a small amount in each of a large number

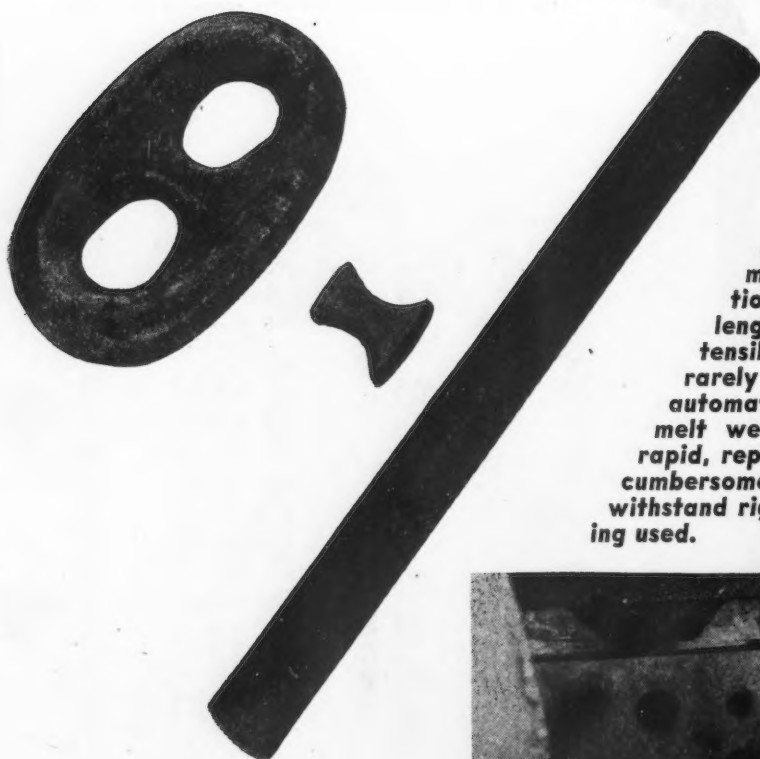
of passes. One chromium-manganese steel and a nitrogen treated chromium-manganese steel attained at tensile strength of almost 270,180 lb. per sq. in. The strength of these steels, however, was much less after heavy reductions in a few passes. Steels (1), (5) and (6) attained a tensile strength of 177,750 to 213,300 lb. per sq. in. after cold rolling.

When the austenitic steels (not nitrogen-treated) were given heavy reductions per pass, the magnetic saturation value reached a maximum and then decreased, but when reduced by small amounts per pass this value steadily increased. In the cold rolling of the austenitic steels, the magnetic transformation was markedly dependent on the temperature. No relationship could be found between the phase condition as determined by magnetic saturation values and the sensitivity to intercrystalline corrosion. This sensitivity decreased with increasing deformation.

FIG. 7B—Assembly of two heating panels for flowing tin on electrolytically coated strip. The strip passes between the panels, and the panels float on supports, the distance from the moving strip being constantly varied by pyrometers.



... Unionmelt Welded

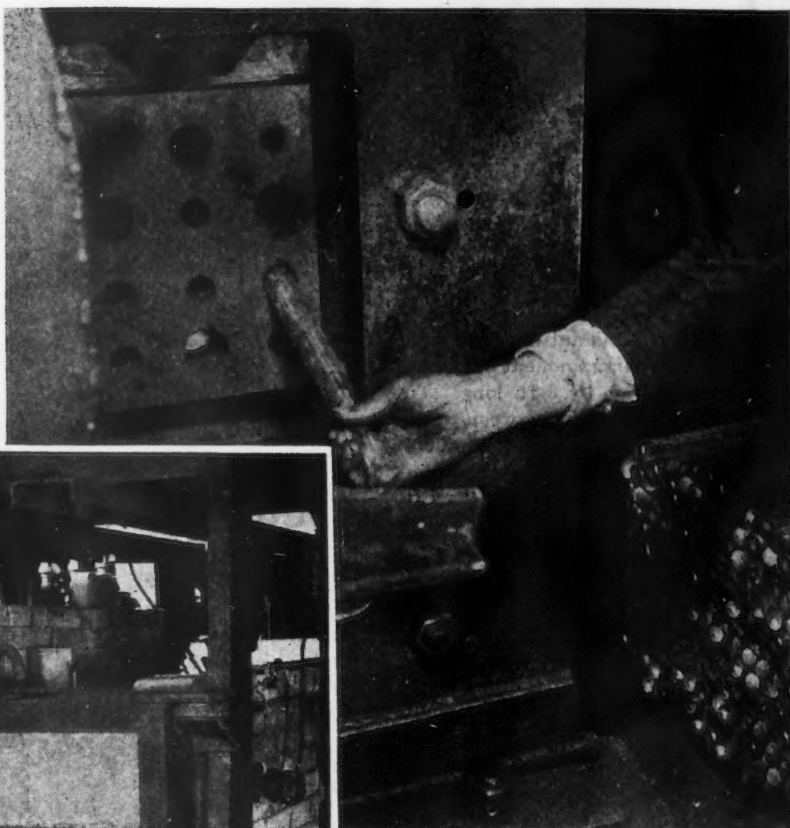


SINCE reliable strength is a first requisite for anchor chain used in maritime services, Blaw-Knox Co. turned to automatic submerged melt welding as a rapid and economical means of making the thousands of intermittent individual welds in chain fabrication at its Columbus plant. When 90 ft. lengths of $1\frac{3}{8}$ in. chain are subjected to a tensile strength test of 157,000 lb. failures rarely occur at the 97 points that have been automatically welded. In this application Unionmelt welding demonstrates its adaptability to rapid, repetitive work in the line fabrication of a cumbersome product which in its finished form must withstand rigid Navy tests and inspection before being used.

Photographs by courtesy of Linde Air Products Co.

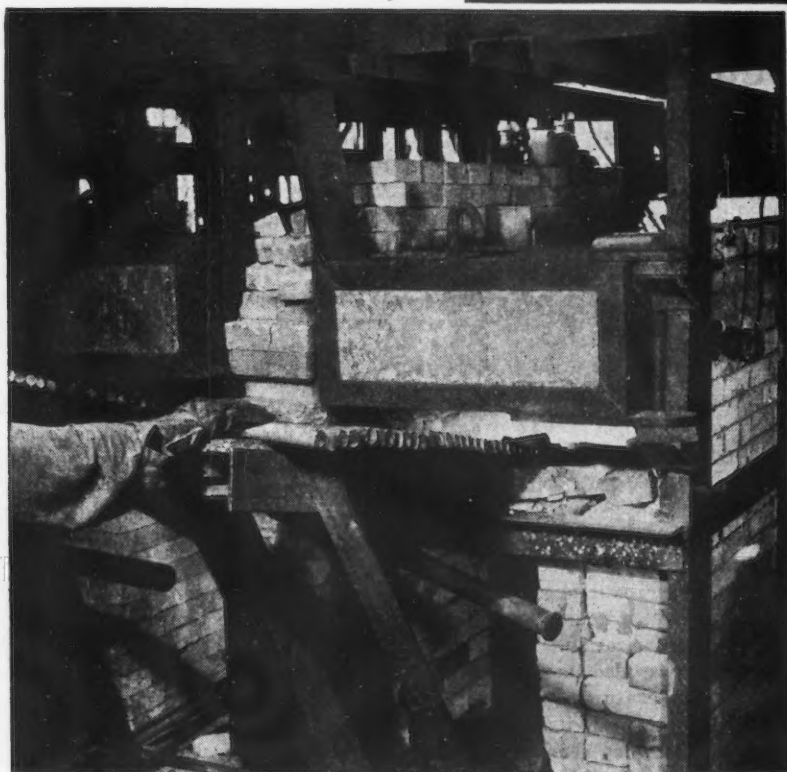
ABOVE

FIG. 1—Each alternate link of anchor chain is made from bar stock and a forged stud. The other links of the chain are forged as shown at the top.



ABOVE

FIG. 2—The bar stock is sheared to the proper length for bending and welding.



LEFT

FIG. 3—Short lengths of bar stock are fed into a continuous furnace for pre-heating.

Anchor Chain

• • •



ABOVE

FIG. 4—Two forged links are placed in a fixture in the bending machine and the heated bar is inserted through them and bent to shape. The bending operation leaves a V-shaped space required for the automatic welding. As the links are formed, the chain is wound on a spool until a 15-fathom (90 ft.) "shot" has been made. A shot consists of 98 forged links and 97 bent links.



ABOVE

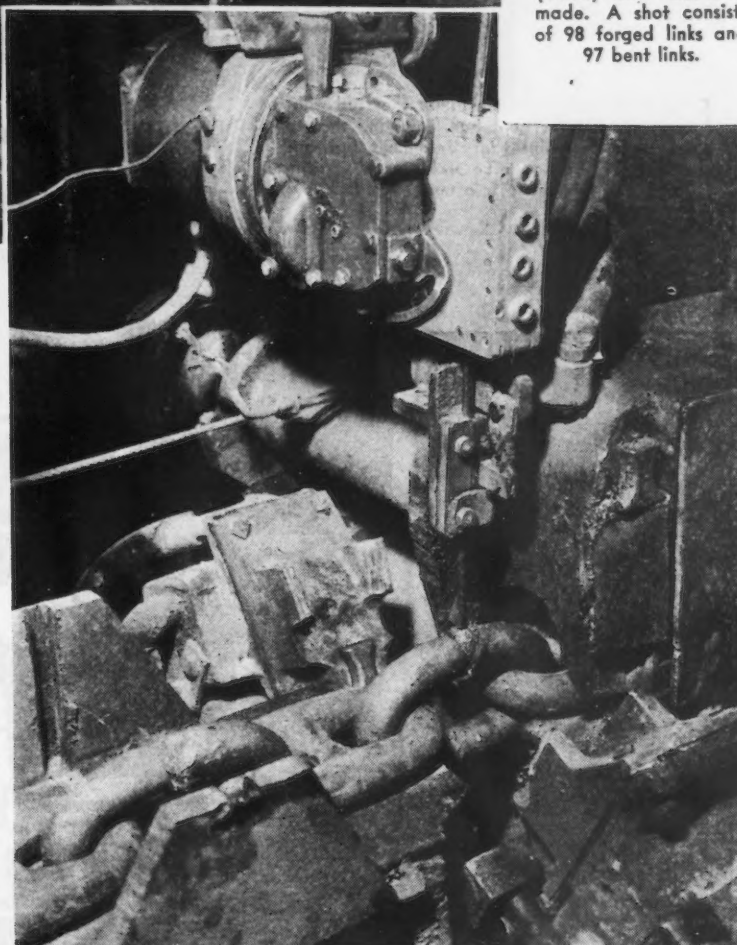
FIG. 5—As the formed chain is fed from the spools to the battery of Unionmelt welding machines a small wad of steel wool is inserted in the opening in the links to provide the electrical contact for starting the welding operation. Reels of 5/16 in. welding wire and the welding transformers are located in a balcony above the welding stations. The transformers deliver 1600 amp. at 35 volts to each head.

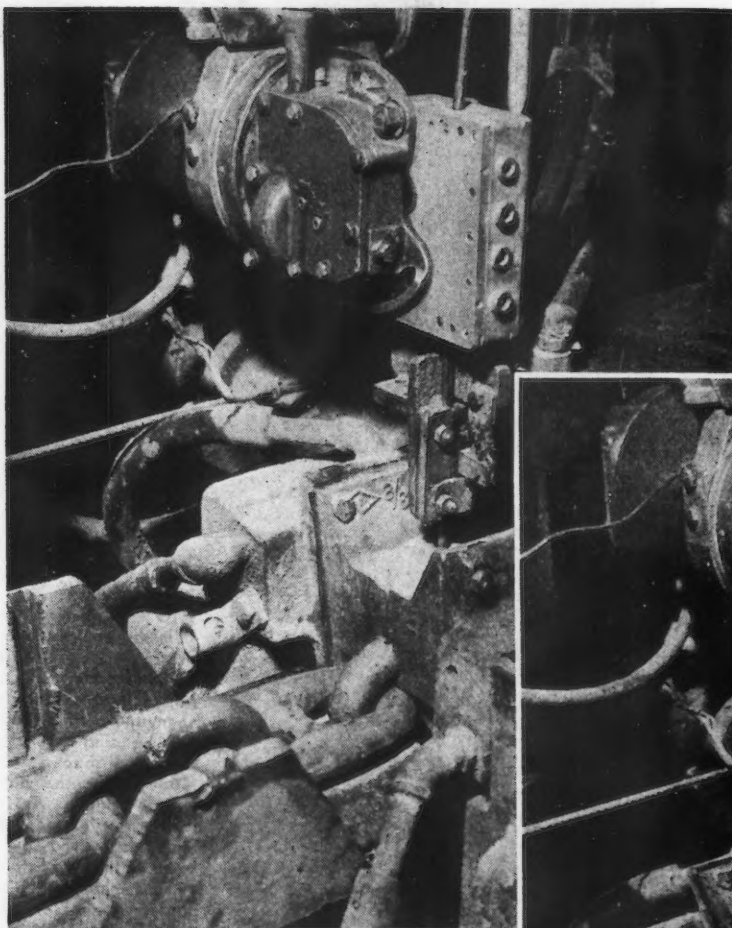
• • •

RIGHT

FIG. 6—The link to be welded is fed into the welding machine and a stud is laid in one of the water-cooled copper clamping shoes, shown open in this view. The welding wire is fed down into contact with the steel wool.

• • •

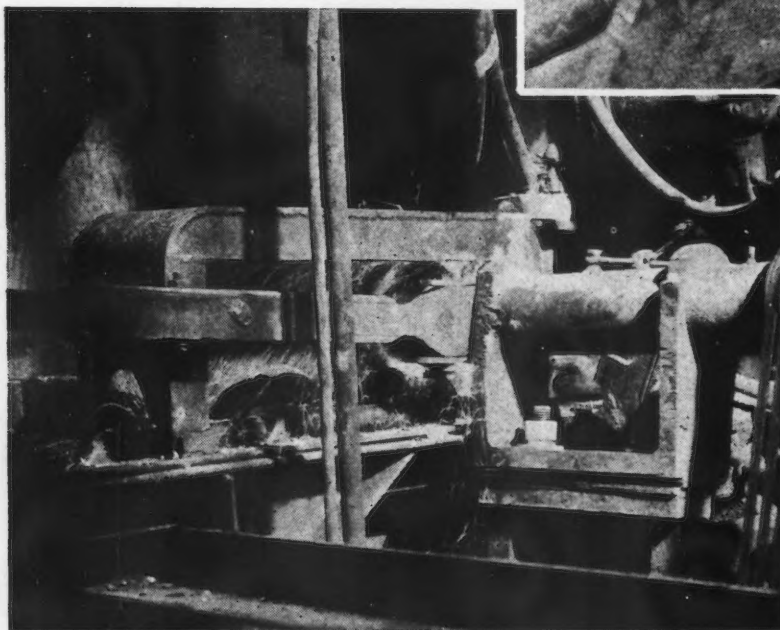




ABOVE

FIG. 7—Closing the shoe aligns the stud with the open ends of the bent bar. Welding then takes place under a blanket of Unionmelt flux and is completed in 16 sec. The weld metal is literally cast in place in a metal mold.

o o o



LEFT

FIG. 9—While the next link is being welded, the welded link goes to a hot milling machine adjacent to the welding station, where the red-hot excess metal is removed from the weld.

o o o

o o o

BELOW

FIG. 8—This shows the completed automatic weld. It joins the ends of the bar and also anchors one end of the center stud.

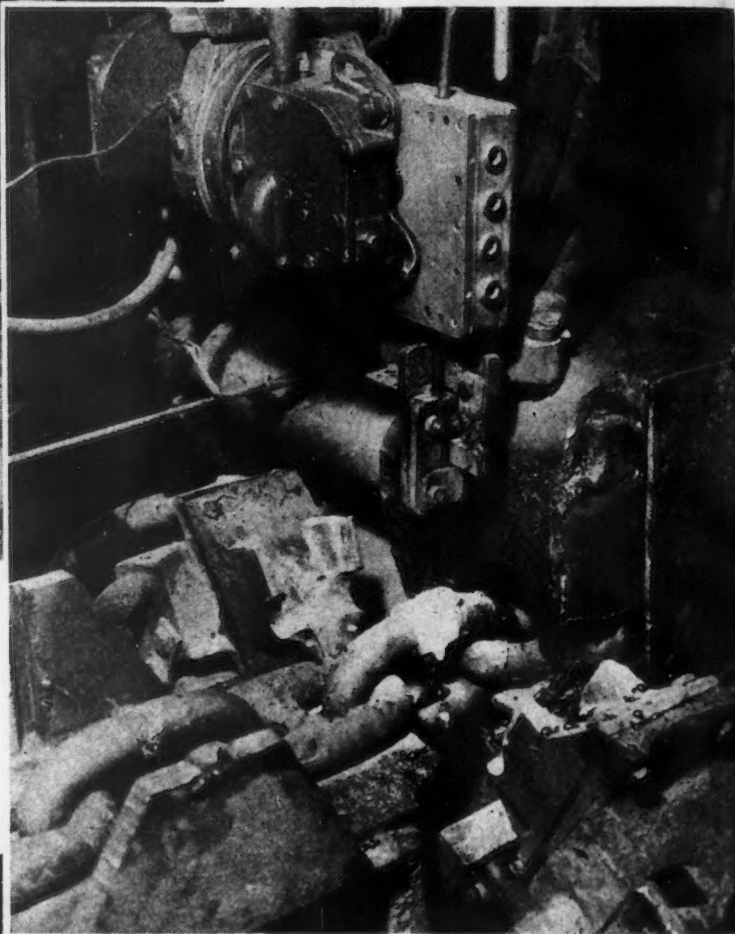
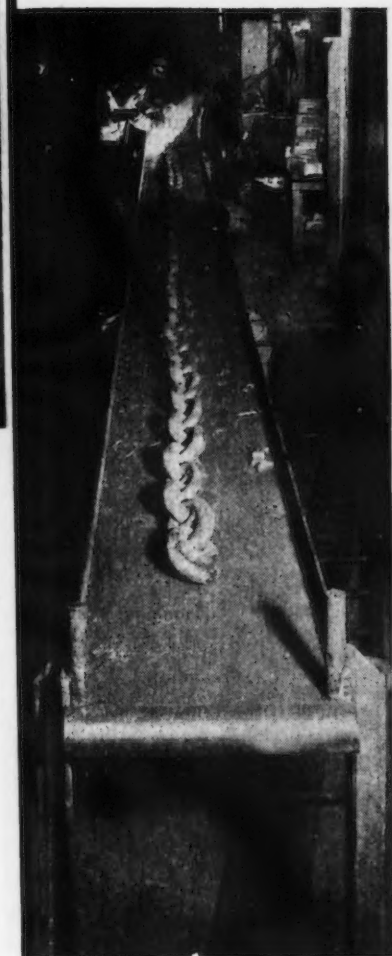


FIG. 11—
in a ca
ld at a



ABOVE

FIG. 11—The finished chain is next placed in a car-bottom annealing furnace and held at a temperature of 1625 deg. F. for about 1½ hr.

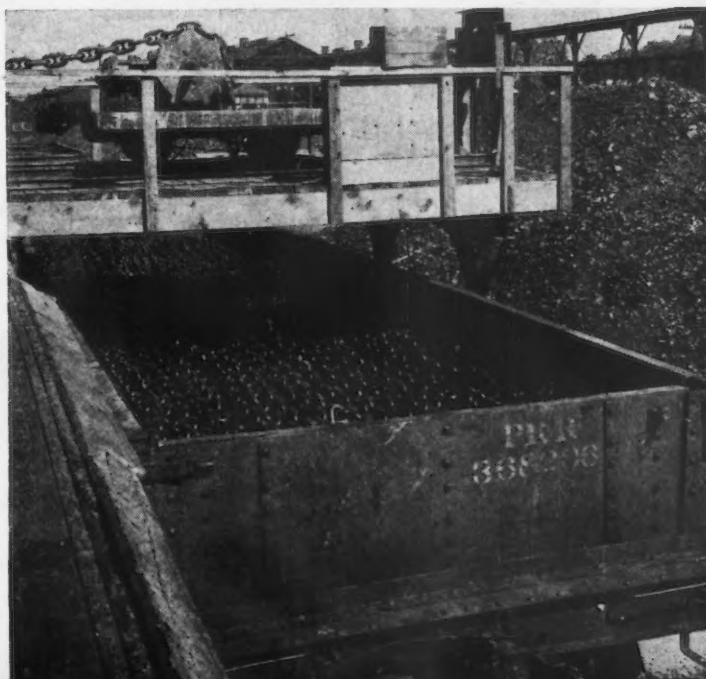


BELOW

FIG. 13—Upon acceptance the chain is dip painted in a trough and loaded in railroad cars for shipment.

LEFT

FIG. 10—From the hot milling operation the chain is fed to a steel channel trough, where the other end of the stud is manually arc welded to the links. At an adjacent station on the trough excess metal from the arc welding operation is ground off the chain which is then wound on spools for transfer to the first inspection table. Here it receives a company inspection and a preliminary Navy inspection.



BELOW

FIG. 12—At the testing pit each 15-fathom shot is given a tension test at 157,000 lb. A shot must weigh no less than 1690 lb. and must be exactly 15 fathoms long within a tolerance of plus 5 or minus 15 in. From every fifth shot four extra links are cut off and tested to destruction. The breaking load is 235,000 lb. minimum. In the final inspection, any six links must measure 42¼ in. long, with a tolerance of plus or minus 5/32 in. This close tolerance is necessary to assure that the chains will not bind on the "wildcat" or the anchor windlass on shipboard.

Production Galvanizing Of Ammunition Cases

By ALLEN T. BALDWIN
*Hanson-Van Winkle Munning Co.,
Matawan, N. J.*

THE use of hot galvanizing to provide a protective coating for steel ammunition cases made to hold 40 mm. anti-aircraft shells for the U. S. Navy has been an interesting development. The production schedules have been large and the variety of parts small, so that speedy procedures could be devised. Early contracts were placed with manufacturers who had little or no previous experience in hot galvanizing. They approached the subject open-mindedly, intent on using the methods, materials and equipment that would assure volume production of a satisfactory product.

No fundamental changes in the hot galvanizing process were required. The problem at the start was to galvanize these cases, complete, at the rate of 50,000 per month and its solu-

tion required the selection of the proper method and equipment. The cases are made of sheet steel formed and welded to an approximate size of 11 x 11 x 20 in. and weighing slightly more than 20 lb. each. A chafing strip reinforces the top edge and inside the case are various cross members welded to the shell and used to hold the contents in place.

There are covers having movable members by means of which they are locked in seats to provide a watertight closure. In many instances, these have been electro-galvanized and have been assembled after plating. In other cases they have been partly hot galvanized and partly plated. The quantities involved have been such as to permit familiar methods of production plating to be used.

The procedure finally installed in the plant of the Ferro Stamping & Mfg. Co., Detroit, is illustrated in part by the accompanying pictures. The cases arrive in the galvanizing department lightly coated with oil, free of heavy scale, but having some spots of light rust and welding oxide film. Their surface, therefore, is closely similar to that of the sheet metal wares of commerce as they arrive to be hot galvanized. The general preparatory procedures are the same, except that the No. 20 flux is used to make a flux wash, rather than muriatic acid.

The simple sturdy rack shown in Fig. 1 was developed to carry units of ten cases and covers from the starting point through all the preparatory treatments and delivers its

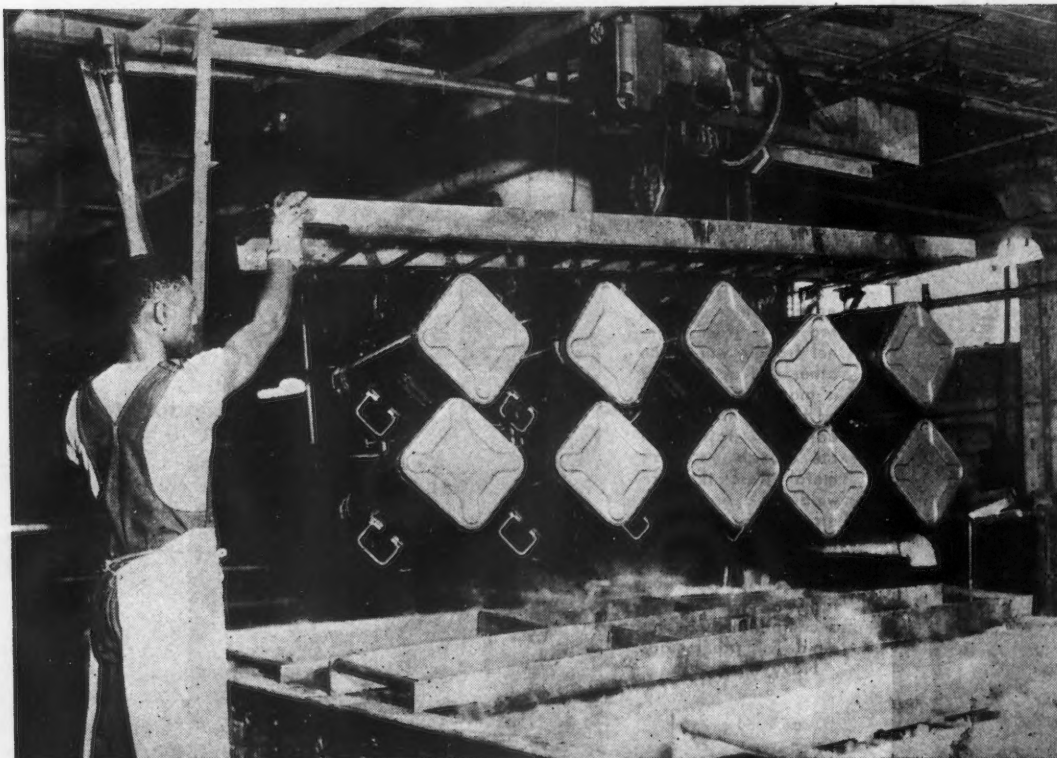
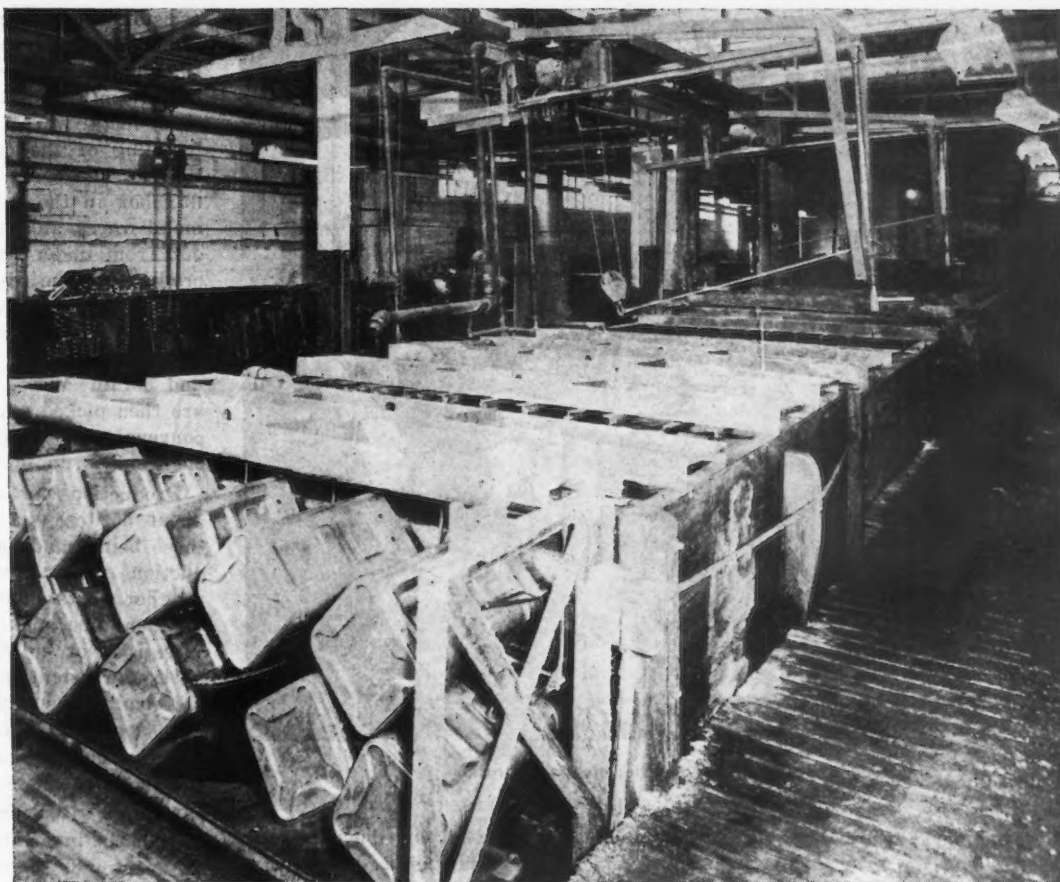


FIG. 1—Rack used in preparation of bodies and covers. Photo by Ferro Stamping & Mfg. Co.

FIG. 2 — Cleaning, pickling and flux dipping equipment.



load at the galvanizing kettle without intermediate handling or transfers of the load. The rack parts which are submerged have generally been made of an acid-resisting alloy. The cases are supported on a long rod and are held in place by a toothed piece at the inner end which holds the case firmly in an inclined position to assure thorough draining.

The complete preparation of the work for the hot galvanizing takes place in the series of tanks shown in Fig. 2. The first step is to clean the cases in a hot alkali cleaner which takes place at the distant end of the series of tanks in Fig. 2. The subsequent steps are to rinse in water, pickle, rinse again and dip in the No. 20 flux wash. The rack of finished cans at the front of the picture is allowed to stand to permit excess flux wash to drain out and the desired protecting flux film to form.

The cleaner is a moderately strong alkali compound, used at 6 oz. to 8 oz. per gal. at about boiling temperature, in the steel tank which appears in Fig. 1. The consumption of cleaner is of the order of 0.2 per oz. per case and cover cleaned. The rinse tanks are also made of steel, while the pickle and flux tanks are made of wood and have facilities for heating

their contents without causing dilution of the contents of these tanks.

The pickle is sulphuric acid and varies in different plants from 3 per cent to 12 per cent of 66 deg. sulphuric acid by volume. The pickling is generally done at about 160 deg. F. The cold water rinse following this pickling is an important step and the operators have quickly observed that thoroughness here has led to better flux wash life and cleaner actual galvanizing. The more completely the residual pickle acid and ferrous sulphate are removed from the work by the rinse, the lower the dross production and the smoother and more ductile the coating as well as the less the tendency of fused flux to adhere to the galvanized surface. So, one feature of these new plants was to provide a generous supply of cold rinse water running freely, constantly.

The acid consumption approximates 2 oz. to 6 oz. of 66 per cent acid per case and cover. The flux wash varies between 15 deg. and 18 deg. Baume and is used at 170 deg. to 180 deg. F. The racks of work are allowed to stand in this hot flux wash for a few minutes to permit the heat to drive out the absorbed hydrogen remaining from pickling. A No. 20 flux wash of

15 deg. Baume will contain about 2 lb. of solid chemicals per gallon and when freshly made will have a pH of 4.0 to 4.2 by electrometric measurement. These data are being used as a basis for checking the thoroughness of the rinsing after pickling. Contamination by pickle acid will lower the pH, and when this occurs the actual performance of each step should be checked carefully. The total flux consumption as flux wash and kettle flux is also about 4 oz. per case.

Properly prepared cases, after the flux film has dried on, should show practically no traces of greenish or brown areas. Such coloring generally indicates re-oxidation resulting from slow drying. Excessive contamination of the flux wash will also discolor the work. These imperfections are avoided easily and as a result a superior final galvanized surface is readily obtained. Various shapes of zinc kettles are being used, heated by different fuels in different ways. Early installations were designed to use hot circulating gases and were made wide to provide space for automatic feeding devices to be installed later. The demand for immediate production and the actual results obtained by using three and sometimes four crews about a single kettle acted to keep a demand

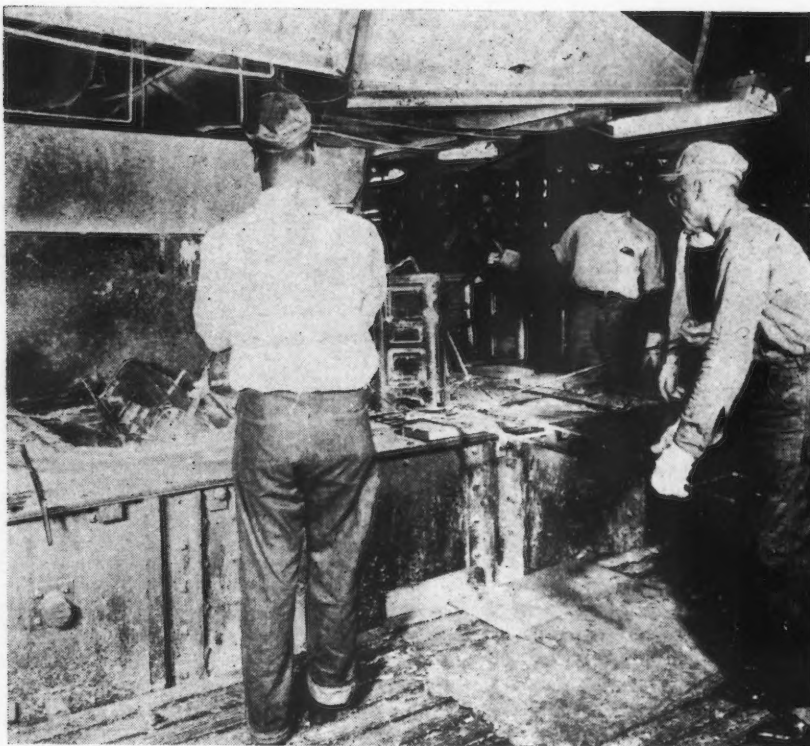


Fig. 3—Galvanizing kettle; manual operation.

for automatic feeding devices in the background for a long time. [Automatic machines for putting cases through the zinc kettle are now in widespread use. A device designed by Hamilton Mfg. Co. is generally used.—Ed.]

The exit end of one side of a kettle of an early installation appears in Fig. 3 showing two cases being removed practically simultaneously. The sheet iron partition towards the center of the pot forms one side of the flux box. A second such partition farther along the side of the kettle com-

pletes the flux box and beyond it the kettle appearance is a duplicate of that shown at the front of the picture. There is ample room for two men to act as feeders at the flux box on each side of the kettle so that a production unit can work about each of the four corners of the kettle, although three such units are commonly working.

Safety provisions to control flux explosions have been taken by the use of baffles in the boxes themselves.

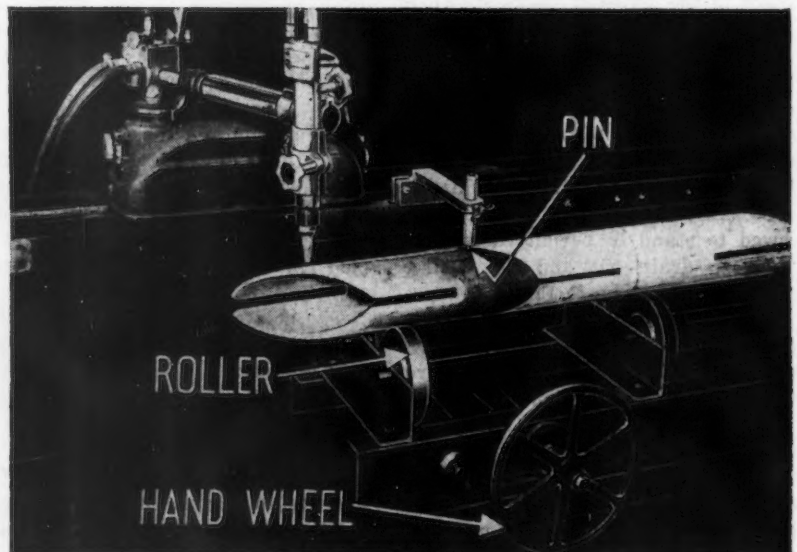
A basic crew of men about the kettle is three with supplemental

assistance depending on local conditions in the various plants. A distinct point of variation in procedure here from that of the manufacture of sheet metal wares is that little or no handling of the cases is done with tongs. The cases are placed in the flux box in the usual way for sheet metal wares, an operator guides them out from under the flux box into a cradle with the open end of the case facing the take-out man who can exert the necessary pressure slowly and steadily to lift and drain the case and obtain smooth coats. The cases are then picked up, moved to a roller conveyor and reversed so that the open end is up.

Production per crew varies from about 35 to over 50 cases per hr., those being made at the higher production rates having heavier and rougher coats of zinc on them. A common zinc pick-up value for the cases is 32 oz. to 36 oz. per case. No particular attention is paid to size or uniformity of spangle. Freedom from flux spots and a high degree of smoothness are required and obtained. Distortion of the cases is avoided and particular attention is devoted to details of the inner and outer surface at the open ends so that the covers will seat easily and perfectly.

This whole procedure is a special application of the time tried methods of galvanizing sheet metal wares such as ash cans and the like. It is especially interesting because companies generally inexperienced in hot galvanizing have been able to use these methods with improvements in details to create high speed production units which deliver high quality hot galvanizing economically.

THE task of burning tubes to shape with relative accuracy proved to be quite difficult until the method illustrated was developed by Chester Fabian, Westinghouse Electric & Mfg. Co., Jersey City. A cylindrical sheet metal template is slipped over the tube at some distance from the torch where it cannot be damaged and is brought into contact with a fixed follower pin. As the burning operation progresses, the template is kept in contact with the pin by rotating the tube on the trunnion rollers and moving the work carriage longitudinally with the hand wheel. The torch remains in a fixed position. Adopting this new setup resulted in increased production and quality because no layout is required and there is very little setup necessary. Large quantities of various shaped tubes for welded structural uses have been gas cut successfully and economically.



Shear Strength of Copper Brazed Joints

By N. L. KING

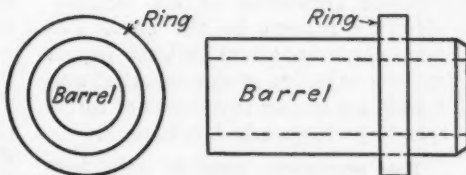
Engineering Test Laboratories,
Consolidated Vultee Aircraft Corp.,
San Diego, Calif.

WHETHER or not the degree of surface finish of the brazing interfaces has any influence

on the resulting joint was the object of a test recently terminated in the engineering test laboratories of the Consolidated Vultee Aircraft Corp., San Diego, Calif. Differences in joint strengths were not sufficiently large or in the direction to warrant conclusions concerning the influence of the surface finish factor.

The test specimens were copper brazed units made up of a barrel member and a ring drive-fitted over it, conforming to the sketch. The specimens, 53 in number, comprised four groups of samples whose surface finishes and interferences or negative clearances (difference between ring diameter and barrel diameter) are shown in the table below.

Each group of specimens was identified by the symbols D, E, F and G respectively. Each of these symbols represented the fineness of the surface finish of the machined barrels and their corresponding rings. Specimens with the symbol D had the finest finish, and each following group was twice as rough as the preceding group.



SPECIMEN used for testing copper brazed joints consists of a barrel and a ring drive-fitted over it.

The surface finishes of the specimens used in this test were reproduced in accordance with reference samples furnished by General Electric Co. The degree of surface roughness on these references is measured in microinches (millionths of an inch) and represents the average deviation from a center line on a profile contour of the surface.

All specimens were tested in shear in a 200,000 lb. Southwark-Emery testing machine using the 0 to 100,000 lb. range.

In general, the average shear values of the test specimens with the four

different finishes, D to G inclusive, varied only slightly as shown in the table. However, the E series, which had the second finest finish, was slightly lower in shear strength. In all cases the shear strength was found to be in excess of 23,000 lb. per sq. in.

Because of the somewhat lower shear strength values obtained on the group of specimens of surface finish E than on the other three groups, a second test was made as a check, with the substitution of a central solid cylinder in place of a tube. As in the previous test the interference was approximately 0.001 in.

Values of shear strengths obtained on these specimens ranged from 32,200 to 50,700, averaging 41,400 lb. per sq. in. as against the previous range of 23,700 to 35,000, averaging 29,300 lb. per sq. in. However, in view of the inherent microscopic irregularities of fit at brazing interfaces, and the physical nature of the cementation process involved in brazing, it is questionable to attribute the above increases in shear strength entirely, if at all, to the change in specimen design from a central tube to a central plug.

Results of Shear Tests on Copper Brazed Joints

| Specification No. | Degree of Surface Finish | | | | | | | |
|-------------------|--------------------------|-------------------|--------------------|-------------------|---------------------|-------------------|---------------------|-------------------|
| | D (32 microinches) | | E (63 microinches) | | F (175 microinches) | | G (250 microinches) | |
| | Interference In. | Shear Lb./Sq. In. | Interference In. | Shear Lb./Sq. In. | Interference In. | Shear Lb./Sq. In. | Interference In. | Shear Lb./Sq. In. |
| 1 | 0.0011 | 37,500 | 0.001 | 28,800 | 0.001 | 34,000 | 0.001 | 32,400 |
| 2 | 0.0011 | 34,300 | 0.001 | 31,400 | 0.001 | 27,100 | 0.001 | 25,300 |
| 3 | 0.0011 | 34,300 | 0.001 | 33,100 | 0.001 | 34,300 | 0.001 | 34,300 |
| 4 | 0.0011 | 38,200 | 0.001 | 25,750 | 0.001 | 32,500 | 0.001 | 32,100 |
| 5 | 0.001 | 27,900 | 0.0011 | 25,600 | 0.001 | 33,400 | 0.001 | 28,800 |
| 6 | 0.001 | 39,200 | 0.001 | 28,100 | 0.001 | 34,100 | | |
| 7 | 0.001 | 32,200 | 0.001 | 27,300 | 0.001 | 25,300 | 0.0012 | 35,500 |
| 8 | 0.001 | 32,100 | 0.001 | 30,600 | 0.001 | 35,800 | 0.0012 | 33,400 |
| 9 | 0.001 | 37,500 | 0.001 | 25,500 | 0.001 | 35,800 | 0.0012 | 30,900 |
| 10 | 0.001 | 28,200 | 0.001 | 34,100 | 0.001 | 27,900 | 0.0013 | 32,900 |
| 11 | 0.001 | 31,300 | 0.001 | 35,000 | 0.0012 | 34,500 | 0.0013 | 33,600 |
| 12 | 0.001 | 34,100 | 0.001 | 26,600 | 0.0012 | 36,400 | 0.0018 | 29,600 |
| 13 | | | 0.001 | 23,700 | 0.0013 | 34,100 | 0.0018 | 34,400 |
| 14 | | | 0.001 | 34,100 | 0.0011 | 37,900 | | |
| 15 | | | 0.001 | 30,200 | | | | |
| Average | | 33,900 | | 29,300 | | 33,100 | | 31,900 |

Interference (negative clearance) is barrel diameter minus ring diameter. The shear area of all specimens equalled 1 sq. in.

Impact Resistance vs. Hardness of Aircraft Low Alloy Steels

SINCE little information has been available on the normally expected impact resistance of aircraft low alloy steels, the Fort Worth Division of the Consolidated Vultee Aircraft Corp., Fort Worth, Texas, carried out tests to determine the relationship between resistance to impact and hardness for these steels as well as values which might be expected under the circumstances of various heat treatments.

Izod test specimens of SAE X4130, 4140 and X4340 steel were subjected to various heat treatments, and tested in an impact testing machine. Rockwell hardness readings were then made on the fractured test bars.

When the impact resistance value of all steels tested were plotted against Rockwell hardness values of each particular steel, a straight line equation was obtained. As the values did not show a wide scatter, it was concluded that there is a definite relationship between resistance to impact and hardness. It may also be concluded that if any low alloy steel

in this classification is heat treated to a certain hardness (or tensile strength), approximately the same Izod impact resistance value will be obtained regardless of the alloying elements present in the steel. The tests also emphasized that the impact resistance values of salt quenched materials are higher than those of corresponding oil quenched specimens.

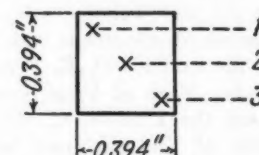
The specimens used in this test were A.S.T.M. 10 x 10 mm. square Izod test bars. Test bars were cut from single pieces of each of the following materials: (1) X4130 steel (22 test bars); (2) 4140 steel (22 test bars); (3) X4340 steel (22 test bars).

All specimens were heated to 1575 deg. F. and held at that temperature for 30 minutes. Eleven test bars of each type of material were quenched in oil (70 to 150 deg. F.) and 11 test bars of each type of material were quenched in molten salt (500 deg. F.) and held at that temperature for 10 min. Two specimens of each type of steel (oil quenched were submitted

to single 1 hr. draws at 600, 750, 900, 1050, and 1200 dg. F. Two specimens of each type of steel (salt quenched) were submitted to two separate draws (double-draw) of 1 hr. each at 600, 750, 900, 1050 and 1200 deg. F.

All specimens were then tested in the Riehle impact testing machine. This machine delivers 110 ft.-lb. of energy by the release of a pendulum. When the pendulum strikes the specimen, it fractures it and records on a dial the amount of energy absorbed or required to fracture the specimen.

A transverse cut was then made 1 inch from the smooth end of each fractured specimen and Rockwell readings were made in the positions (approximate) shown in the following cross-sectional view:



Correlation of Izod Impact Resistance and Rockwell Hardness Data

| Draw Temperature Deg. F. | SAE X4130 | | SAE 4140 | | SAE X4340 | |
|--------------------------------|------------------------------|------------------------|------------------------------|------------------------|------------------------------|------------------------|
| | Impact Resistance Ft. Lb. | Hardness Rockwell C | Impact Resistance Ft. Lb. | Hardness Rockwell C | Impact Resistance Ft. Lb. | Hardness Rockwell C |
| Oil Quenched Low Alloy Steels | | | | | | |
| 600..... | 14 | 44.2 | 7 | 47.5 | 14.5 | 47.7 |
| 750..... | 21.5 | 42.1 | 11 | 45.7 | 18 | 45.2 |
| 900..... | 52 | 33.2 | 41.5 | 37.0 | 40 | 38.1 |
| 1050..... | 87 | 25.1 | 66 | 31.6 | 63.5 | 32.2 |
| 1200..... | 98 | 20.2 | 81 | 25.5 | 83 | 25.6 |
| *(a)..... | 22 | 45.5 | 6 | 52.0 | 14 | 54.0 |
| Salt Quenched Low Alloy Steels | | | | | | |
| 600..... | 32 | 32.6 | 13.5 | 46.5 | 19 | 47.6 |
| 750..... | 32 | 31.1 | 16 | 43.6 | 19.5 | 45.9 |
| 900..... | 50.5 | 25.3 | 43 | 35.9 | 41 | 36.5 |
| 1050..... | 91.5 | 18.4 | 75 | 27.5 | 74 | 29.5 |
| 1200..... | 107 | 13.0 | 91.5 | 20.3 | 90 | 22.2 |
| *(b)..... | 42 | 29.5 | 20 | 48.0 | 23 | 49.0 |

*(a) Control sample—As quenched in oil at 70-150 deg. F.

*(b) Control sample—As quenched in salt bath at 500 deg. F. (held for 10 min.).

Impact values are averaged for two specimens at each draw temperature. Hardness values are averages of three readings taken on each specimen, or six readings for each draw temperature.

Low Alloy Steels

By JOHN M. THOMPSON, JR.

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Vultee Aircraft Corp., Fort Worth,
Texas.

... A definite relationship between resistance to impact and hardness for SAE X4130, 4140 and X4340 steels is established on the basis of empirical data. The effects of various heat treatments on salt quenched and oil quenched materials are compared.

Izod impact resistance values and Rockwell hardness readings for oil quenched specimens and salt quenched specimens drawn at temperatures of 600, 750, 900, 1050 and 1200 deg. F. are presented in the table.

The data plotted in Fig. 1 shows that there is a direct relationship between Izod impact resistance values and Rockwell hardness readings. The slight scatter of readings along this straight line may be discounted except for those readings obtained for salt quenched SAE X4130 steel. These readings are much too low and are probably due to the fact that this material was not hardened sufficiently by the 500 deg. F. salt bath quench. This fact is also brought out by the data presented in the table. The properties of the control specimens are nearly the same as those of the specimens drawn at 600 and 750 deg. F. If this material were quenched in a bath maintained at a lower temperature, the Rockwell would be higher and the straight line equation of Fig. 1 would then show that the Izod impact resistance of this material would be lower.

This straight line graph also shows that any low alloy steel that will heat treat to a certain tensile strength of Rockwell hardness will have nearly the same Izod impact resistance value as any other low alloy steel heat treated to the same hardness and strength. It is possible to predict on the basis of this graph the approximate Izod impact resistance of any low alloy steel from its Rockwell hardness reading.

Fig. 2 presents the effect of drawing temperature on the impact resistance or toughness of any of the low alloy steels that were tested. It is apparent that salt quenched materials have better properties than oil quenched steels, that is, salt quenched materials are tougher or have more resistance to impact than oil quenched steels drawn at the same temperature. All of the low alloy steels follow the same curve, each one becoming less brittle as the drawing temperature increases. There is only a small spread of values obtained for all types of materials tested with the exception of salt quenched X4130. The spread in this material seems to be caused by the lack of structural

homogeneity developed by incomplete hardening during the quench.

The effect of drawing temperature on the Izod impact resistance and Rockwell hardness for oil quenched and salt quenched SAE X4130 steel is shown in Fig. 3. This graph shows the rapidity with which the toughness increases when the hardness or tensile strength of this low alloy steel is decreased. This data may be used in design to determine what heat treatment any of the steels should be given in order to obtain a suitably tough or impact resistant material for a particular use. The fact that a temperature of 500 deg. F. is too high to properly salt quench X4130 material is shown in this graph.

Fig. 4 shows the effect of drawing temperatures on hardness and impact resistance of SAE 4140 steel. The oil quenched steel is harder but is not as tough as salt quenched steel. There is only a slight variation or spread in Rockwell and impact resistance between values attained for salt quenched and oil quenched material.

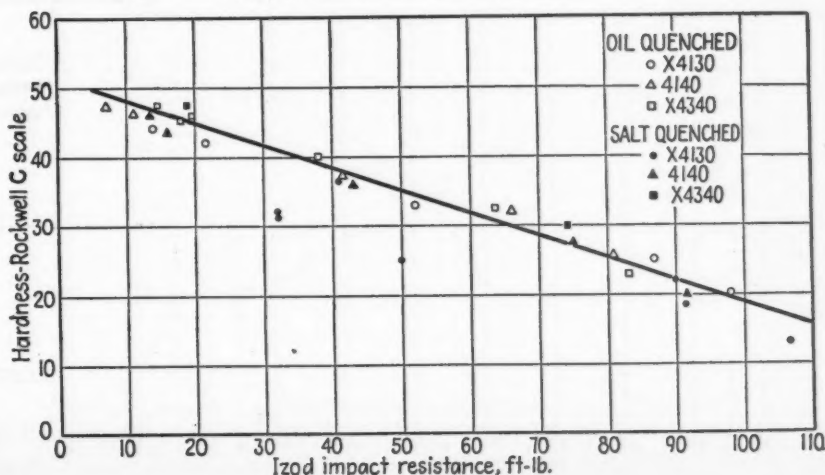
The hardness and impact resistance values of X4340 are nearly identical for salt quenched and oil quenched specimens that were drawn at the

same temperatures. This fact is shown in Fig. 5. The salt quenched specimens have slightly better impact resistance values than oil quenched specimens.

The values of the control specimens in the table reveal some very interesting facts. SAE X4130 steel that was drawn at 600 deg. F. has practically the same Rockwell hardness as the control specimen (not drawn) but has lower impact resistance values. This would indicate that it is possible to obtain a better steel in the "as quenched" condition than by drawing 1 hr. at 600 deg. F. in some cases. SAE 4140 and X4340 steels drawn at 600 deg. F. have greater impact resistance and lower hardness than control specimens of these respective materials. This is in line with the statement that drawing will lower the hardness and increase the impact resistance of low alloy steels.

The fact that 4140 and X4340 salt quenched specimens, drawn at 600 deg. F., have lower impact resistance values than the "as quenched" control specimens, indicates that a drawing temperature over 750 deg. F. is required to materially increase the impact resistance values of "as quenched" material. High drawing

FIG. 1—A definite straight line relationship is indicated in this graph which plots Izod impact resistance readings against Rockwell hardness readings for low alloy steels drawn at various temperatures.



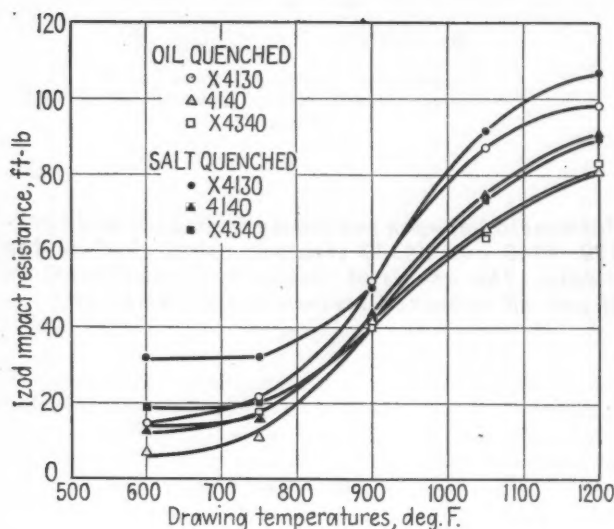


FIG. 2—According to this graph presenting the effect of drawing temperature on impact resistance, the salt quenched steels are tougher than oil quenched steels drawn at the same temperature.

temperatures will cause a proportional drop in tensile strength and hardness according to tabular data.

A comparison of the values of the oil quenched control specimens with those of the salt quenched specimens shows that all salt quenched alloy steels have lower Rockwell readings and greater impact resistance values than corresponding oil quenched steels. Generally, all Rockwell values for salt quenched materials are lower than those of corresponding (same draw temperature) oil quenched specimens and all impact resistance values of salt quenched material are higher than those of corresponding oil quenched specimens.

Among other facts that this article brings out from an analysis of the figures are:

(1) The response to hardening in a 500 deg. F. salt bath quench is better in SAE X4340 steel than in either of the other steels.

(2) The SAE X4340 steel responds more slowly to tempering than do either of the other steels.

These two facts combine to show the advantages obtained by the use of this steel. First, since the steel will harden properly during the elevated temperature quench, the mar-tempering process is used to advantage in the hardening of different parts with little or no susceptibility towards distortion or cracking and second, the higher draw temperatures necessary to develop any tensile strength enlarge the tolerances which may be used for any temperature in meeting the requirements of any parts being treated.

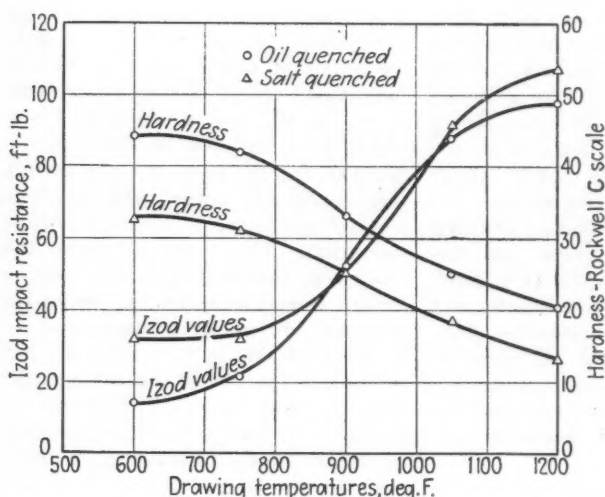


FIG. 3—Impact resistance and Rockwell hardness plotted against drawing temperature for SAE X4130 steel. Note the rapidity with which the toughness increases when the hardness of this steel is decreased. This characteristic is also manifest in the other steels tested (Figs. 4 and 5).

FIG. 4—Impact resistance and Rockwell hardness vs. drawing temperature for SAE 4140 steel. The oil quenched steel is harder but not as tough as the salt quenched steel.

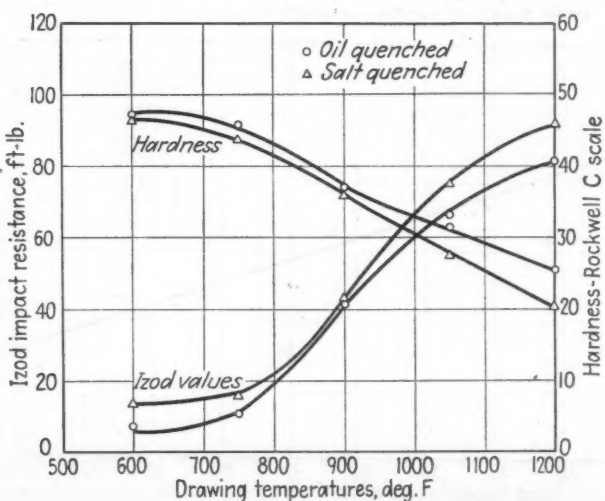
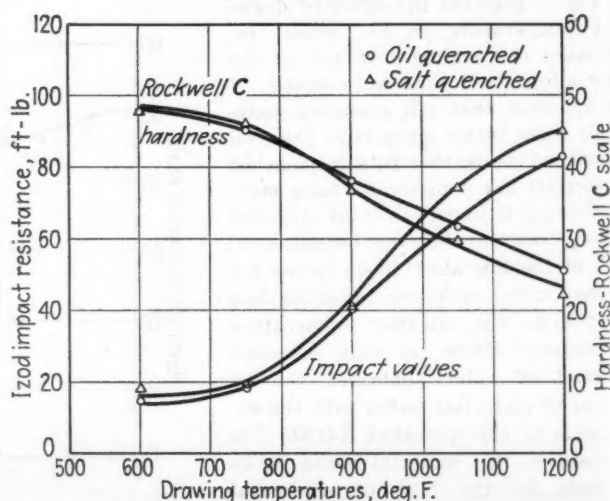
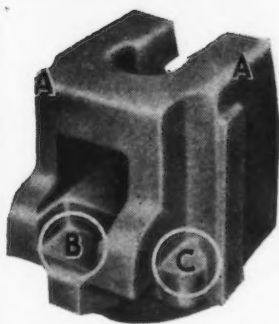


FIG. 5—Impact resistance and Rockwell hardness vs. drawing temperature for SAE X4340. The hardness and resistance values are nearly identical for salt quenched and oil quenched specimens.





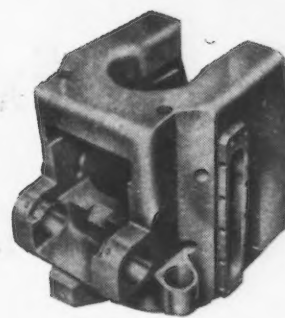
ROUGH machined casting as shipped from the foundry. Note the rounded corners at A, the shaft pocket and other recesses cored out at B, reducing boring and broaching operations, and the recoil lug C integrally cast with the ring, eliminating a welded joint.

BY substituting cast steel breech rings for forgings, ordnance procurement officers halted a serious bottleneck that was developing in breech rings for cannon at the beginning of our rearmament program. Ordnance requirements in gun production then could not be met with the available forging capacity. The story of how the change was made from standard ordnance practice of using breech rings forged from steel exclusively goes back to June 1941 when four cast steel 90 mm. breech

From Forged Breech Rings to Castings

rings were shipped from the Lima plant of the Ohio Steel Foundry Co. to Aberdeen Proving Grounds. The performance of these cast rings, such as firing under heavy overloads and other tests, led to final acceptance.

The change to a steel casting from a forging resulted in a number of savings. By using a sand core to obtain certain contours, the weight before machining was reduced, the cost of the rough part was cut to one-fourth, and every month about 50 tons of critical metals, such as nickel and chromium, were saved. Production had at the same time been increased, since machining was reduced. In one plant, a turret broaching machine working on a casting could broach the breech recess from a cored hole in 15 min. compared to approximately 45 hr. required to do the same operation on a forging by slotting. By substituting the cast rings for the forgings, one gun plant alone was able to reduce its requirements of 21 broaching machines costing approximately \$75,000 each, to



BREECH ring fully machined by gun manufacturer.

four, a saving of over one million dollars in this one item alone.

Rough machining of castings at the foundry shows up practically all the imperfections that would otherwise slow up production in the gunmaker's production lines. Magnaflux and radiography are used in the plant in the development of correct foundry practice on each new design and also to maintain quality control in regular production.

Since June, 1942, the Ohio Steel Foundry Co. has been using its new North Plant to produce cast steel breech rings for all types of guns, from 57 mm. to 240 mm. sizes including the new 75 mm. cannon for aircraft.

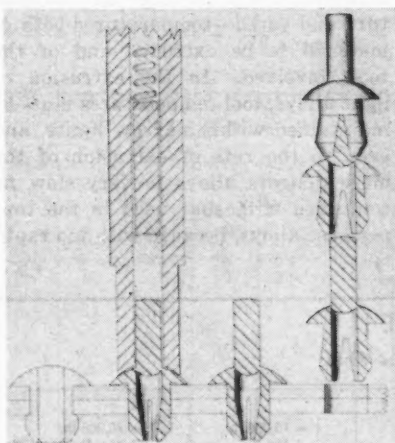
A NEW plastic blind rivet permitting one-man operation is announced by the Plastic Development Division of the Victory Mfg. Co., 1105 Fair Oaks Avenue, South Pasadena, Cal. The design of the Des-Rivet is based on a wedging action and takes full advantage of the flow characteristic of plastic materials under pressure.

See also "Air Expanded Plastic Rivets," THE IRON AGE, July 27, 1944, p. 52.

Des-Rivets are molded as one piece consisting of a head with plug attached by a thin breakaway section and a tapered shank split to form four tapered fingers. The shank and head are hollow to the same diameter as the plug.

The rivet is applied by pressing the tapered fingers into a drilled hole. Taper on the outside diameter of the fingers reduces the inside diameter of the shank. Impact from the rivet gun, which may be manual or air operated, instantaneously shears the plug and drives it into the plastic shank until the plug is flush with both ends of the

Plastic Blind Rivet Developed



STEPS in application of "Des-Rivet." A single operation drives this blind plastic rivet. Operation is speeded up by preassembly of rivets in form of sticks (right).

rivet, maintaining the contour of the rivet head. The wedge action of the plug in the tapered shank expands the fingers against the walls of the drilled hole and upsets the shank end of the rivet. The fact that the Des-Rivet creates its own upset end by flow of the plastic allows for a wide variation in the thickness of the materials being used.

Des-rivets may be singly inserted or assembled in sticks by inserting the undriven plug of one rivet into the shank of another. An automatic rivet gun is available to accommodate sticks of rivets, making possible a very high rate of installation.

A wide variety of shapes and sizes are available in several plastic materials including Nylon. The physical properties of Des-Rivets depend upon the plastic from which they are molded. All conventional and many special colors may be obtained. For use in decorative application, the translucent properties of many of the plastics offer the possibility of combining improved functional value with decorative effect.

Extrusion Of Copper-Base And Aluminum Alloys

ALTHOUGH the annual convention of the Institute of Metals Division and of the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers planned for the week of Feb. 19 was cancelled to comply with the rulings of the Office of Defense Trans-

portation, THE IRON AGE in its Feb. 22 issue presented abstracts of papers on the pressing of powder metallurgy compacts and the effects of heat treating magnesium casting alloys which had been prepared for presentation before the various technical sessions of this meeting.

In preparing its program, the Institute of Metals Division had scheduled a symposium on the extrusion process which included a motion picture and papers on the extrusion process and factors affecting the rate of extrusion of aluminum alloys. The summaries are presented below.

Extruding Plain and Tubular Sections of Copper-Base Alloys

THE extrusion process as applied to plain and tubular sections of copper-base alloys is described in a paper prepared by W. W. Cotter, extrusion expert, and W. R. Clark, vice-president, Bridgeport Brass Co., Bridgeport, Conn.

Since the extrusion process, as is well known, is entirely one of compression, it can deform material without leaving residual tensile stresses and can, therefore, be used on delicate mixtures which cannot be hot worked by straight hot rolling or roller piercing.

The standard machine used in the extrusion process is built in two general styles: One a double-action machine, which is generally employed in tube extrusion and is also advantageous in rod extrusion because a higher pressure may be exerted on the ram when pressure is applied to both

plungers; and the other, a single-action machine used normally in the extrusion of rod and seldom in the extrusion of tubes. Machines having a pressure capacity in excess of 1200 tons are usually horizontal. Smaller vertical machines are used abroad, but owing to their limited capacity, few are in this country.

There are several important differences in the extrusion of copper-base alloys as compared with aluminum and magnesium. These can best be expressed by differences in temperature and speed—temperatures both of material to be extruded and of the tools involved. In the extrusion of light alloys, tool temperatures must be maintained within narrow limits, and even so the rate of extrusion of the more delicate alloys is very slow as compared with that used in the copper-base alloys, because with too rapid

extrusion, cracking takes place in the extruded product.

Many of these alloys can be extruded but cannot be hot-worked in any other way because tensile stresses set up in these materials during the hot-working operation produce cracking or rupture. There is also a distinct limitation of the range of hot-working ability; that is, the difference between the minimum and maximum temperature between which the material can be deformed without excessive pressure on the lower side or incipient melting on the upper. Furthermore, on materials presenting material, therefore, per inch of stroke

is P . P is always larger than $i \log_e \frac{A}{a}$ by the force necessary to force the dummy through the plastic material and to overcome adhesive resistance of the walls of the container on the billet and to overcome die friction.

Ordinary brass weighs 0.305 lb. per cu. in. Therefore, the work done within the material per pound of brass in

foot-pounds is $\frac{i}{0.305 \times 12} \times \log_e \frac{A}{a}$

This equals $0.274 i \log_e \frac{A}{a}$. The specific heat of brass is approximately 0.095, and the heat equivalent of work is, therefore, $778 \text{ ft.-lb.} \times 0.095$, or 74

TABLE I
Temperature Rises

| $\frac{A}{a}$ | $\log_e \frac{A}{a}$ | $i = 5000 \text{ lb.}$ t deg. C. | $i = 10,000 \text{ lb.}$ t deg. C. | $i = 20,000 \text{ lb.}$ t deg. C. |
|---------------|----------------------|-------------------------------------|---------------------------------------|---------------------------------------|
| 8 | 2.0 | 20 | 40 | 80 |
| 20 | 3.0 | 30 | 60 | 120 |
| 56 | 4.0 | 40 | 80 | 160 |
| 90 | 4.5 | 45 | 90 | 190 |

TABLE II

Rod Extrusion Data—Calculated From Gage Readings¹—2200 to 2750 Ton Extruder

| | Nominal ² | | | Temperature, Deg. F. ⁴ | Dummy Dia., In. | Rod Dia., In. | Ratio $\left(\frac{D}{d}\right)^3$ | Log. R | Billet Length, In. | $\frac{L}{D}$ | Maximum Pressure Lb. per Sq. In., Dummy | Minimum Pressure Lb. per Sq. In., Dummy | Maximum Pressure, ⁵ Log. R | Minimum Pressure, Log. R | Extrusion Speed, In. per Sec. |
|------------------------|------------------------|------|-------|--------------------------------------|-----------------------|---------------------|---------------------------------------|--------|--------------------------|---------------|---|---|---|--------------------------------|--|
| | Cu | Zn | | | | | | | | | | | | | |
| Average mixture... | 69 | 31 | ..... | 1517 | 9.38 | 2.81 | 11 | 2.4 | 28 | 3 | 55,000 | 38,000 | 23,000 | 16,000 | 0.4 |
| | 69 | 31 | ..... | 1490 | 9.38 | 2.81 | 11 | 2.4 | 28 | 3 | 59,000 | 39,500 | 24,400 | 16,400 | 0.4 |
| | 69 | 31 | ..... | 1508 | 9.38 | 2.81 | 11 | 2.4 | 18 | 2 | 49,000 | 38,000 | 20,500 | 16,000 | 0.4 |
| | 69 | 31 | ..... | 1508 | 9.38 | 2 @ 1.24 | 29 | 3.3 | 18 | 2 | 61,000 | 55,000 | 18,500 | 16,700 | 0.4 |
| | 69 | 31 | ..... | 1490 | 8.25 | 0.800 | 97 | 4.5 | 14 | 1.75 | 100,000 | 84,000 | 22,400 | 18,700 | 0.3 |
| (3500-ton pressure)... | 69 | 31 | ..... | 1418 | 10.4 | 2 @ 1.24 | 34 | 3.5 | 22 | 2.2 | 76,000 | 65,000 | 22,000 | 19,000 | 0.4 |
| | Nominal ^{2,3} | | | | | | | | | | | | | | |
| | Cu | Zn | Pb | | | | | | | | | | | | |
| | 61 | 35.5 | 3.5 | 1382 | 9.38 | 2.65 | 14.3 | 2.65 | 28 | 3 | 43,000 | 26,500 | 16,000 | 10,000 | 1.0 Av. |
| | 61 | 35.5 | 3.5 | 1409 | 9.38 | 2.65 | 14.3 | 2.65 | 18 | 2 | 34,000 | 24,000 | 12,700 | 9,100 | 1.5 Av. |
| | 61 | 35.5 | 3.5 | 1409 | 9.38 | 1.1 | 83 | 4.4 | 28 | 3 | 42,500 | 35,000 | 9,500 | 8,000 | 0.8 Av. |
| | 61 | 35.5 | 3.5 | 1409 | 9.38 | 1.1 | 83 | 4.4 | 18 | 2 | 40,500 | 33,500 | 9,200 | 7,500 | 0.7 Av. |

¹ Owing to throttle effect of gage piping, readings are subject to some error if pressures change rapidly. ² Copper and zinc may vary ± 1 per cent. ³ Lead may vary ± 0.25 per cent. ⁴ Temperatures vary ± 10 deg. ⁵ Pressures vary ± 10 per cent.

ft.-lb. Therefore, 74 ft.-lb. is required to raise the temperature within the deformed material 1 deg. F., or 133 ft.-lb. per 1 deg. C. The work done within the material in extrusion of brass will result in the temperature rise equal to $0.0036 \log. \frac{A}{a}$ per deg.

F., or $0.002 \log. \frac{A}{a}$ per deg. C.

In the extrusion of ordinary brass, I

$\log. \frac{A}{a}$ (I representing the minimum

pressure per square inch of dummy area during the extrusion and equal to P min.) usually will increase with the copper content from 7000 to 10,000 lb. in alloys containing less than 61 per cent copper to as high as 16,000 to 22,000 lb. in alloys containing more than 70 per cent copper, depending upon the temperature and rate of extrusion.

Table I has been compiled to show

temperature rises with various ratios of $\frac{A}{a}$ and with values of i given at 5000 lb., 10,000 lb. and 20,000 lb. per sq. in.

Not all of this temperature rise is manifest in the extruded rod under ordinary speeds of extrusion. Some of it is expended in heat transfer to the die and back into the unextruded portion of the billet adjacent to the die, depending somewhat upon the rate of heat conductivity of the material and the rate of extrusion. But it is evident from Table I that the extrusion of hard alloys is limited by the ratio of $\frac{A}{a}$.

On the one hand, there is a maximum permissible temperature of extrusion, which, if too near the melting point of the alloy, will allow insufficient leeway for temperature rise in the extrusion operation before incipient melting or cracking of the extruded section takes place. On the

other hand, too low a temperature requires too high an initial extrusion pressure.

The pressure on the dummy required to extrude increases rapidly when the billet length is greater than its diameter. This is caused by the increased frictional effect of the container surface on the surface of the billet, which increases with billet length in resisting plastic flow due to surface adhesion and cooling. The pressure again increases, particularly with slow ratio of extrusion, as extrusion shortens the billet to 5 or 10 per cent of its original length, owing to temperature loss to container, die and dummy, and to the increasing effect of die and dummy and friction on the plastic flow. Further extrusion of this short end or stump only creates scrap, and is of no practical benefit.

In checking billet temperatures and ram pressures under normal extrusion

TABLE III

Tube Extrusion Data Calculated From Pressure Readings¹—2000 to 2200 Ton Horizontal Tube Extruder

| Metal | Nominal ² Mixture | | | Temperature, Deg. F. ³ | Dummy, Dia. D., In. | Tube, Dia., In. | Mandrel, Dia., In. | Tube Area, a | Ratio $\frac{D^2}{4a}$ | Log. R | Billet Length, In. | Maximum Pressure, ⁴ Lb. per Sq. In., Dummy | Minimum Pressure, Lb. per Sq. In., Dummy | Maximum Pressure, Log. R | Minimum Pressure, Log. R | Extrusion Speed, ⁵ In. per Sec. |
|---------------------------------|---------------------------------|------|-----|--------------------------------------|---------------------------|-----------------------|--------------------------|--------------------|---------------------------|--------|--------------------------|---|--|--------------------------------|--------------------------------|---|
| | Cu | Zn | Sn | | | | | | | | | | | | | |
| Admiralty..... | 70 | 29.0 | 1.0 | 1472 | 8.11 | 2 $\frac{1}{16}$ | 2 $\frac{1}{16}$ | 2.85 | 19 | 2.95 | 13.5 | 66,000 | 58,000 | 22,500 | 19,700 | 0.7 |
| Alpha..... Leaded 2 and 1... | 67 | 32.5 | 0.5 | 1364 | 8.11 | 3 $\frac{1}{16}$ | 2 $\frac{11}{16}$ | 3.9 | 13.3 | 2.8 | 9 | 58,000 | 48,000 | 22,200 | 17,700 | 1.4 |
| | 67 | 31.5 | 1.5 | 1328 | 8.11 | 3 $\frac{1}{2}$ | 2 $\frac{7}{16}$ | 4.8 | 11 | 2.4 | 10.5 | 63,000 | 48,000 | 26,000 | 20,000 | 1.2 |
| Aluminum brass.. | 77 | 21.5 | 2.0 | 1535 | 8.11 | 2 $\frac{1}{2}$ | 1 $\frac{7}{8}$ | 2.14 | 24.4 | 3.2 | 8.75 | 69,000 | 56,500 | 21,600 | 17,700 | 0.9 |

¹ This tabulation represents average results from 20 readings of each alloy.

² Copper content may vary ± 1 per cent. ³ Temperatures varied ± 10 deg.

⁴ Pressures varied ± 10 per cent. ⁵ Speeds varied ± 20 per cent.

rates with preheated containers and preheated tools, the basic pressure

$\log \frac{A}{a}$ for the standard free-turning brass-rod mixture (containing 60 to 61.5 per cent Cu; 3.25 to 3.75 per cent lead and the remainder zinc, with some iron and tin impurity kept below 0.25 per cent) at billet temperatures from 1382 deg. to 1418 deg. F., is found to vary from 7500 to 10,000 lb. per sq. in. For cartridge brass extruded at 1490 deg. to 1527 deg. C., the basic pressure varies from 16,000 to 19,000 lb. per sq. in. of dummy area. In the former case, ram speeds run from 0.7 to 1.5 in. per sec.; in the latter, ram speeds are 0.3 to 0.45 in. per sec.

Multiple hole extrusion is resorted

to where the $\left(\frac{D}{d}\right)^2$ and $\frac{L}{d}$ are too large to permit of successful extrusion of a single small section. The pressure required in multiple extrusion is somewhat greater than with a single hole of equal area to the multiple dies owing to greater surface areas of the multiple dies, but not in proportion to the benefit derived from the reduction of pressure by reducing

$$\log \left(\frac{D}{2d}\right)^2 \text{ or } \log \left(\frac{D}{3d}\right)^2$$

Table III gives data obtained from the tube extrusion of four different alloys. This tube extrusion shows a slightly higher minimum extrusion pressure than is shown in Table II for the average rod extrusion and a somewhat lower maximum, the latter due

to the fact that the billet length is less in all cases than in rod extrusion.

It is to be expected that the basic pressure in tube extrusion would be slightly higher due to the increase in chilling of the billet by the piercing mandrel and the increased frictional resistance caused by the mandrel surface during extrusion.

Also, the speeds were somewhat greater in the tube extrusion than in that of the rod. It is desirable to extrude tubing at a considerably faster rate than rod in order to keep the contact time between the piercing mandrel and the billet within as short a period of time as possible, so that the mandrel will not be heated sufficiently to unduly reduce its tensile strength.

Factors Affecting the Rate of Extrusion of Aluminum Alloys

THE most important factors affecting the rate of extrusion of aluminum alloys, which were mentioned in the Cotter and Clark paper, are discussed in a report by T. L. Fritzlen of the Reynolds Metals Co. Pressure and speed of extrusion, he points out, are exponential functions of each other. When a certain condition tends, for instance, to increase the pressure required for extrusion, if the pressure is maintained at a constant, the extrusion speed is reduced. The relationship between the temperature of the material being extruded and the pressure required to extrude is also of the exponential type and as the temperature is increased, the pressure required is decreased.

From this, it would seem that the greatest rates of extrusion can be obtained by the use of higher temperatures. However, other factors intervene to limit the rate of extrusion of aluminum alloys when increasing the temperature. These are: Characteristics of the equipment; size and structure of the ingot, and temperature of the ingot and cylinder.

The capacity of the press determines the maximum unitary pressure that can be applied for any given cylinder diameter. Pressures used for extrusion of aluminum alloys range from approximately 50,000 lb. per sq. in. up to 150,000 lb. per sq. in., depending on the alloy and the size of the shape extruded. Higher pressures could be used to advantage, but existing steels limit pressures employed in the production of extrusions.

Numerous mechanical characteristics of the extrusion press affect extrusion rates. The most important characteristics of the press itself are:

(1) Sensitivity of the main pressure valve and accuracy of pressure gages; (2) accuracy of equipment to heat the cylinder uniformly and to control cylinder temperature, and (3) accuracy of means for measuring the speed of extrusion. The variables subject to control during the extrusion operation are pressure, temperature and speed and it is evident that the preceding characteristics of the press should be such as to enable close control of these variables.

The strength of the auxiliary equipment, such as tool holder, die, back-up piece and block, may limit the maximum pressure that can be exerted during extrusion. The length, contour and size of the extrusion die also affect the rate of production. The shorter the length of the die bearing, the lower the pressure required to extrude.

Another factor affecting the extrusion speed is the sharpness of corners or fillets in the extruded shape. Cracks or checks, produced by too high a speed of extrusion, always start at the sharp corners, so that the speed has to be limited for sharp cornered shapes.

The size of the die opening also affects the rate of production. The friction between the metal and the die is higher the smaller the cross-sectional area of the shape, creating the need for higher pressures for thin material. The flow of the metal also is easier in shapes with large cross-sectional areas, because the internal friction of the metal is lower and consequently the pressure required is lower.

The length of section or shape to be extruded should be limited to 60 ft. or shorter, as it has been observed that this generally allows extrusions to be

produced at the highest speed with the best surface. Other considerations determining the length are handling methods, the finished length, the maximum rough length that can be heat treated, and the amount of butt end or discard.

The alloy composition is also an important factor in the extrusion rate. The various aluminum alloys require varied pressures to extrude; those alloys requiring the least pressure can be extruded at the highest speeds.

Listed below are the common aluminum alloys in order of required pressure of extrusion, from the lowest to the highest:

2S
3S
53S, 61S
52S, 25S
14S, 17S, 11S
24S, 18S, 56S
75S, R303

The more pressure an alloy requires for extrusion, the higher the temperature required, and subsequently the lower the allowable extrusion speed.

Aluminum alloys, in the as-cast condition, tend to show a cored structure. This tendency, which is practically absent in alloys with a low alloy content, like 2S or 3S, is very pronounced in alloys with high Cu or Mg contents, as 24S and 56S. The extrusion of as-cast ingots must be conducted at lower speeds than for ingots having a homogenous structure. By controlling the casting procedure, it is possible to reduce this coring effect. However, the control required is so close, as to make it impossible under normal conditions of production. To minimize this lack of homogeneity of the material, a solution treatment of the ingot is necessary.

The temperatures of the material being extruded and of the equipment are very important factors governing the rate of extrusion. When extruding, stresses are set up in the shape at the point where it emerges from the die. The higher the extrusion pressure, the higher the stresses. If these stresses exceed the strength of the shape, breakage will occur. The strength of aluminum alloys, as of all other materials, decreases with increasing temperatures. This decrease is particularly appreciable at the temperatures used for extrusion.

A large part of the work produced by the extrusion is transformed in heat. Most of this heat is dissipated to the air, either directly from the shape, or through the cylinder and die. When the rate at which this heat is generated surpasses the rate of dispersion, the temperature of the shape will rise. Under conditions normally used, the temperature of the shape emerging from the die increases as the extrusion progresses.

This rise in temperature will further reduce the strength of the material, and in extreme cases, may be of such a magnitude that the eutectic temperature of the alloy being extruded is reached. At this temperature the strength of the alloy drops abruptly.

The main factor governing the maximum allowable speed is the strength of the material when emerging from the die. In direct extrusion the pressure is maximum at the start and then decreases with progression of extrusion. For minimum pressure

requirement, the material should be as hot as possible at the start of extrusion. On the other hand, when extrusion has started, the pressure will drop and the important factor becomes the speed of extrusion. To obtain maximum speeds of extrusion, the temperature of the emerging shape should be as low as possible.

These contradictory requirements can be met by having the ingot at a higher temperature than the extrusion press cylinder. If the extrusion is started as quickly as possible, the ingot will be at a high temperature at the start and will progressively be cooled down by the cylinder which is at a lower temperature.

Actual production data have shown that the best results with strong aluminum alloys are obtained when this temperature difference is about 50 deg. F. In the case of strong aluminum alloys, increases of allowable speed from 25 to 60 per cent have been obtained when using the above temperature difference, as compared with extrusions conducted with ingots at a temperature 100 to 200 deg. F. lower than the cylinder temperature.

In the latter case maximum pressure is required to start extrusions with a marked drop in required pressure when the charge is started. In the first case maximum pressure is also required at the start, but the pressure drop is not so great, due to cooling of the ingot by the cylinder.

The large mass of the press cylinder in relation to the mass of the ingot causes the cylinder to have a pronounced effect on the temperature of

the emerging shape. A cylinder at a temperature lower than the starting ingot temperature will extract heat from the ingot as extrusion progresses. This enables extrusion at a higher speed since it lowers the temperature of the emerging shape and tends to counteract the normal increase in temperature obtained in the shape as extrusion progresses.

Since the temperature of the shape limits the allowable stresses which the shape will stand, and these stresses are dependent upon the pressure and therefore govern the speed of extrusion, it is evident that a close control of the temperature of the cylinder is an important factor.

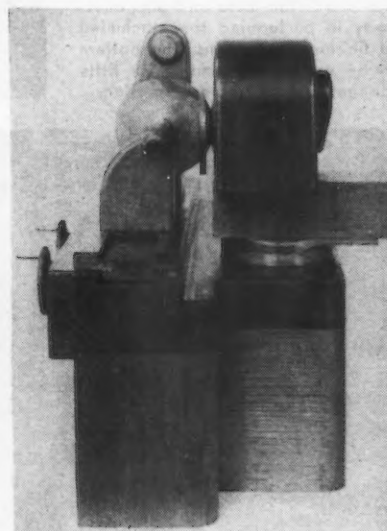
The most important zone of the cylinder in regard to temperature of the shape is the end, where the die is located. Especially close control in this zone is very important. In addition to the cylinder, also die, back up and block temperatures are important, especially when extruding shapes less than 0.064 in. in thickness, since the thinner shapes cool more rapidly than the heavier shapes when passing through the die.

Attempts have also been made to cool the die either during extrusion or in between cycles. This would permit the use of high temperatures of the ingot, which are conducive to higher speeds, and at the same time would permit keeping the temperature of the emerging shape low enough to obtain in the shape sufficient strength to withstand the higher stresses produced by the higher speeds.

Wooden Models Aid In Machine Design

WOODEN models recently helped General Electric's Lynn River works' supercharger division arrive at the best design for a special machine to handle the job of grinding integral wheel and shaft assemblies. Four angles 0 to 90 deg. were to be finished on each side of the wheel and several diameters on the shaft. Either a specially constructed machine or a converted grinder equipped with raising blocks and an extra swivel under the wheel head was required. Quarter-size wooden models of machines proposed for the job were accurately made by

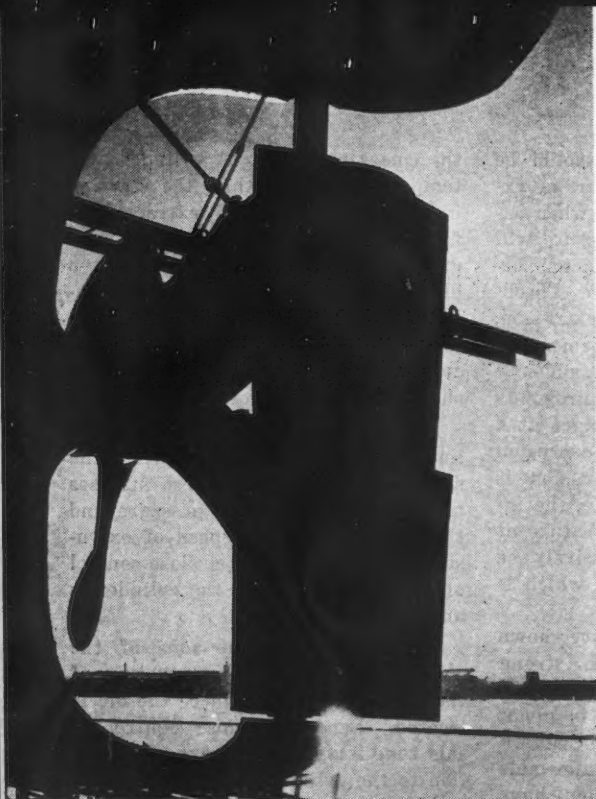
both the pattern shop and the machine tool manufacturer. For economy, the ways were simplified to dovetail or tongue and groove, but were correctly located and marked with limits of travel. The models permitted every relationship between wheel and work to be duplicated quickly and accurately to determine capacities and limitations of the machines. These models not only helped design a machine for a difficult job, but simplified the training of inexperienced operators to do it. The models are now being used to further improve methods.



QUARTER-size wooden model of proposed grinding machine, illustrating the auxiliary slide between the wheel head and machine base.

SHIP PROPELLERS

TURNING out propellers for all types of ships for the Navy and Maritime Commission is the highly specialized war job of the Cramp Brass & Iron Foundries division of the Baldwin Locomotive Works. Since Pearl Harbor, the division has produced up to September 1944, 72,588 net tons of castings. Most of the propellers cast have been for Victory and Liberty ships but Cramp has also supplied propellers for battleships, battle cruisers, light cruisers, aircraft carriers, destroyers, destroyer escorts and tenders, submarines and submarine tenders, seaplane tenders and coastguard cutters. Shown on these two pages are some of the operations in the casting of a Liberty ship propeller as carried out at the Cramp foundries.

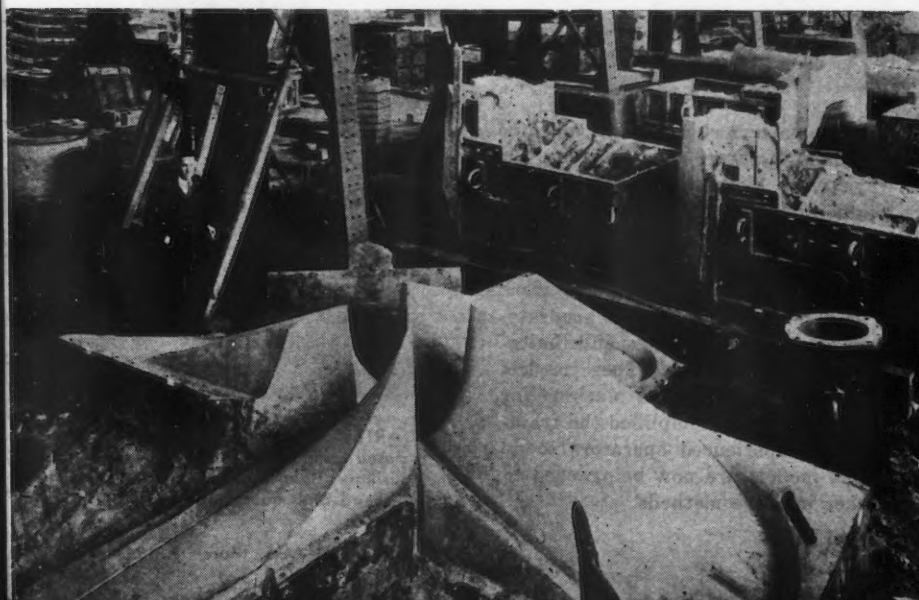


ABOVE

THIS Liberty ship propeller revolves 76 times a minute with energy delivered to it by an engine developing 2500 i.h.p. The tip of each of the four blades circles through the water at a speed of 50 miles per hr. The propeller must be so balanced that each blade will strike the water with a blow corresponding exactly to that dealt by each of the other blades.

RIGHT

THE pattern for each propeller is an unfinished manganese-bronze casting that, if ground and polished, could itself serve as a propeller. All its dimensions, however, are larger than those of the castings produced from it in order to allow for shrinkage of the metal as it solidifies. The larger mass of the rough casting affords compensation for any warping while it is in the mold and also offers leeway in performing the machining and finishing operations. The pattern can be used many times with little danger of injury or deformation.

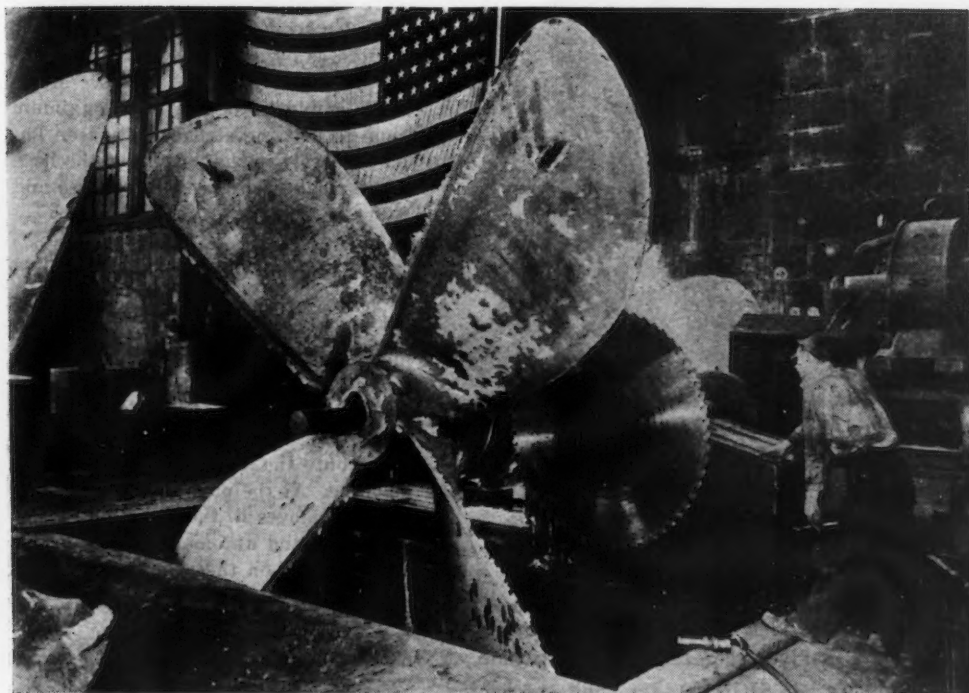
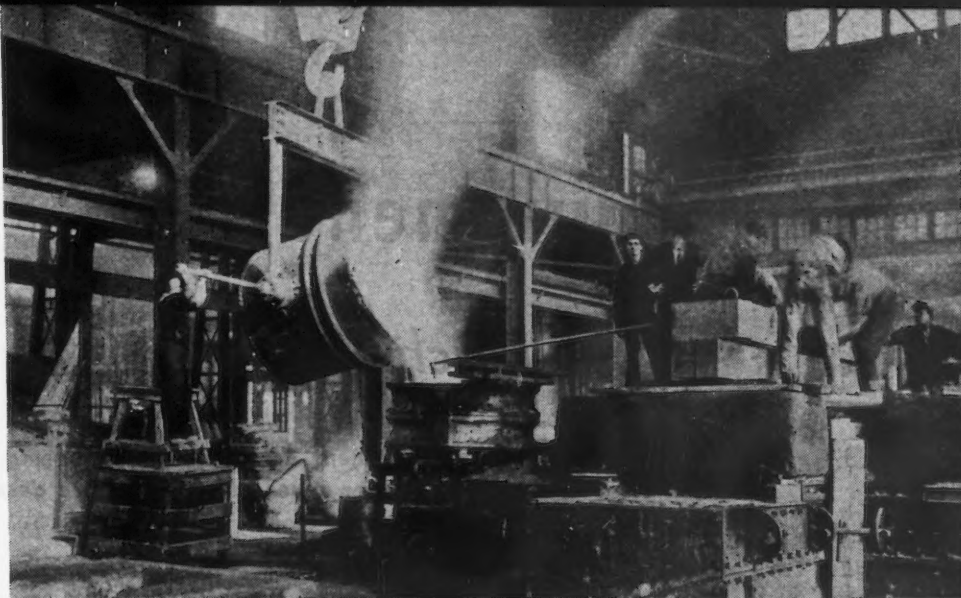


LEFT

LEADING faces of the blades are arranged in the form of a cross on the foundry floor. A mixture of sand and cement is packed about the pattern; being porous, allows steam and gas to escape. After setting several hours, the cope is lifted, pattern removed and the two sections exposed to air for 24 hr., then closed, locked together and allowed further drying time.

RIGHT

AN overhead crane brings the ladle from the furnace, halts it at the exact position to enable two workmen to tilt it and team its contents steadily. When the pouring basin is full enough to assure an even flow into the bottom of the mold, the plug is removed. The ladle holds enough bronze to form one propeller and can be poured in 5 min. Melting capacity of the Cramp Brass & Iron Foundries division of the Baldwin Locomotive Works amounts to about 1750 tons a month.



LEFT

RISERS are here being removed from the rough castings on a circular saw. As it comes from the molds, this casting weighs about 28,000 lb. Propellers for Victory ships weigh 54,000 lb. in the rough.

RIGHT

AFTER the propeller is removed from the mold, it is sent to the finishing shop for cleaning and machining. Final weight of the Liberty ship propeller is 22,000 lb.; its diameter 18½ ft. The finished screw for a Victory ship is 20½ ft. in diameter and weighs 54,000 lb. Final operations are balancing and checking the tapered bore of the hub which receives the tapered end of the ship's tail shaft.

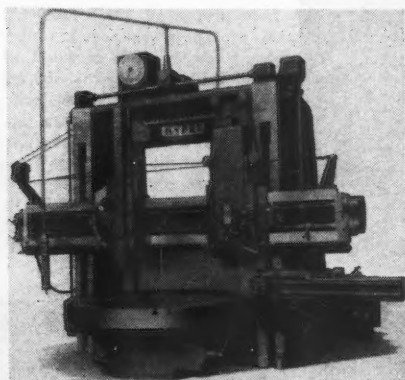


New Equipment . . .

Machine Tools

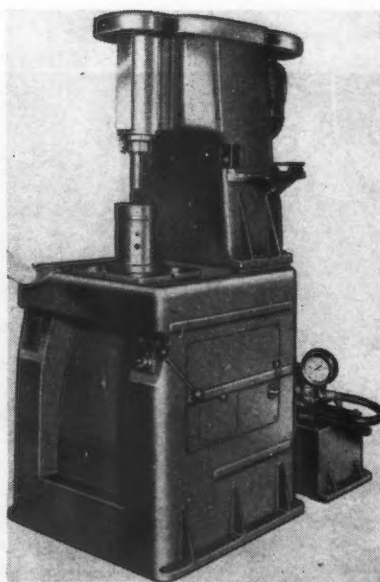
. . . Recent developments in boring, broaching, drilling, grinding and other types of machines are described in the following pages.

A VERTICAL boring mill that features a variable voltage drive has been announced by *Cincinnati Planer Co.*, Cincinnati 9, Ohio. Conventional gear shift changing of speeds has been replaced by fingertip speed adjustment. The complete range of table speeds under cutting loads ordinarily encountered can be handled by push button control from the operator's working position. The multi-point fine increment motor rheostat used together with the drive is said to make available table speeds exactly suited to the job being performed. Setup time is reduced by fine inching control in both directions of table operation. All motors are controlled from a single, accessible pendant station.



Vertical Borer

A VERTICAL borer, Model 44, that handles a wide range of work, has been announced by *Bausch Machine Tool Co.*, Springfield, Mass. The moving parts in the head enable rigid mounting of the spindle head to a solid supporting column which minimizes vibration, and assures maintained spindle alignment with maximum accuracy in boring. Suitable size spindles are available for various sizes of bores and materials to work up to 10,000 r.p.m. The spindle motor



is statically and dynamically balanced and will handle boring jobs up to 5 in. at 5000 r.p.m.

Hydraulic Broaching Machine

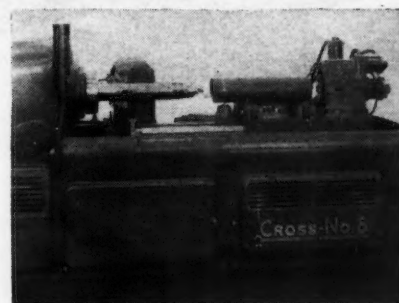
DESIGNED for pull broaching and push broaching on certain types of work and for light push assembly jobs, a horizontal 1-ton, 20-in. stroke hydraulic broaching machine has been developed by *American Broach & Machine Co.*, Ann Arbor, Mich. The draw head has a long bearing with bronze take-up gibs. The



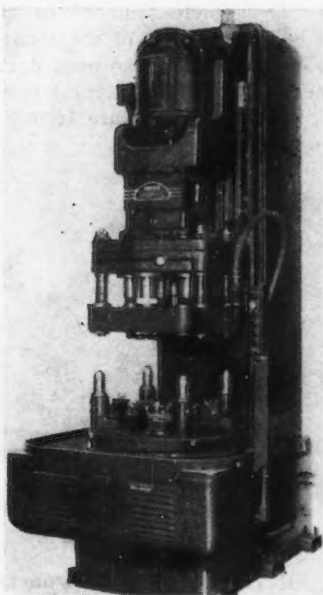
pressure gage is mounted in such a manner as to permit reading of pressure on either side of the hydraulic cylinder by opening the side desired. Control is by a hand lever which operates 4-way hydraulic valves. Maximum stroke is 20 in. and maximum time for cutting stroke is 4½ sec. The oil reservoir in the bottom of the base is provided with an oil level gage and a drain cock.

Cutting-Off Machine

FOR centering and cutting off shell forgings, a No. 8 Cross automatic machine has been developed by the *Cross Co.*, Detroit. It is built to handle shell forgings from 4 to 7 in. in diameter. The shell rolls from the conveyor onto the loading carriage of the machine. At the push of a button, the carriage moves in the direction of the headstock and automatically loads the shell forging on the arbor which then



expands to grip the work in cutting position. The loading rails in the carriage are automatically lowered to clear the work while it rotates and cutting tools feed to depth. After the cutting operation is completed, the tools are retracted, the work stops, the chuck jaws are released, the carriage loading rails are elevated and the pick-up device removes the shell forging as the carriage is returned to the loading position. The shell is unloaded by rolling it out of either the back or the front of the machine.

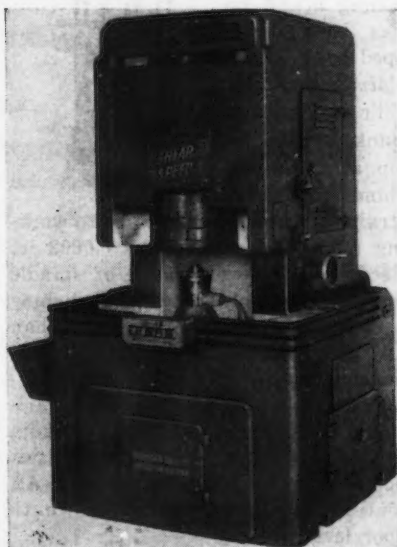


Drilling Machine

A STANDARD 10V18 drilling machine, equipped with a 5-spindle head and using four indexes to complete its hollow milling job on 20 bosses, has been announced by *Snyder Tool & Engineering Co.*, 3400 East Lafayette, Detroit 7. The index table housing serves as a chip trough and coolant retainer. The standard index mechanism provides the acceleration and deceleration of the Geneva wheel, hydraulically powered from the hydraulic system of the machine itself. The machine is available with or without special tooling and speed change transmission for single or multiple spindle adaptations.

New Type Gear Shaper

A MACHINE which cuts all gear teeth simultaneously with radially fed form-tool blades having a shear-cutting action has been developed by

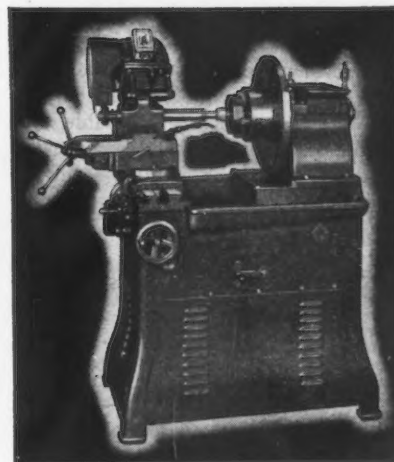


Michigan Tool Co., Detroit. It is said to be capable of rough and semi-finish cutting as many as 60 to 100 or more gears per hour depending on the job. Balanced cutting pressure around the gear is used. No particular skill is required to operate the machine. Chucking is part of the automatic machine cycle. When the machine has completed its cycle, it returns to its loading position automatically and releases the finished gear for removal and loading of another blank. The amount that blades are fed into the work and correct sizing of the work are adjustable. A jog control is also provided on the machine to inch it for setup adjustments when shifting the machine to a different job. Adjustments are also provided for speed of vertical reciprocation and length of stroke. Helical, shoulder and spur gears can be cut. The machine is said to be the simplest method of rough and semi-finish cutting involute splines. The 1843 size is available, for handling kears up to 4 in. in diameter and 2 in. face width.



Cylindrical Grinder

THE addition to its group of grinding and lapping machines of a 4-in. Type C cylindrical grinder has been announced by *Norton Co.*, Worcester, Mass. Available in 12 and 18-in. lengths, the machine is primarily designed for short length, small diameter work. Hydraulic table traverse, automatic infeed of the wheel at each table reversal and adjustable dwell at each end of the table traverse are standard. The machine is available as plain or semiautomatic with manual or automatic cycle. Where a semiautomatic machine is desired, continuous wheel feed can be furnished. Work speeds are from 100 to 1000 r.p.m. Grinding wheels 16 in. in diameter and up to 3 in. wide are available. Other features include a Norton wheel spindle with automatic lubrication and automatic coolant controls.

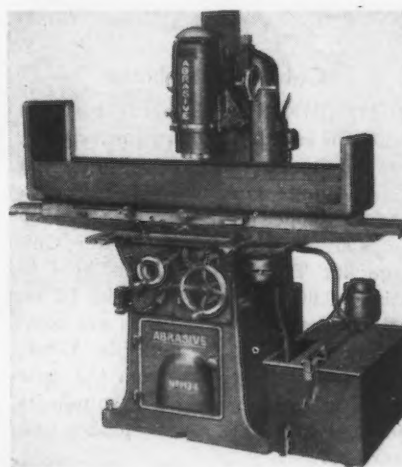


Internal and Surface Grinder

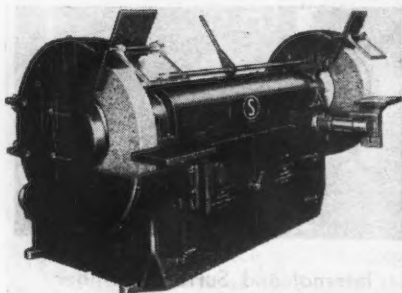
A MODEL ACX internal and surface grinder has been announced by *Lempco Products Inc.*, Bedford, Ohio. Micrometer screw adjustment on the automatic power crossfeed assures precision face grinds. Both rack and pinion and screw feed are available for longitudinal travel. Mechanical stops prevent spoilage. Jaw or magnetic chucks are easily and quickly mounted on the faceplate by a single draw bar through the hollow work spindle. Quick change work speeds are 80 and 130 r.p.m. and spindle speeds are 6000 to 12000 r.p.m. A retractable work head allows additional clearance for larger work. An automatic sizer mechanically duplicates the size of successive pieces.

Vertical Spindle Surface Grinder

A VERTICAL spindle surface grinder, No. M34, which incorporates a powerful motorized grinding spindle with a segment type wheel has been announced by *Abrasive Machine Tool Co.*, East Providence, R. I. More power at the cutting point, minimized vibration and freedom from

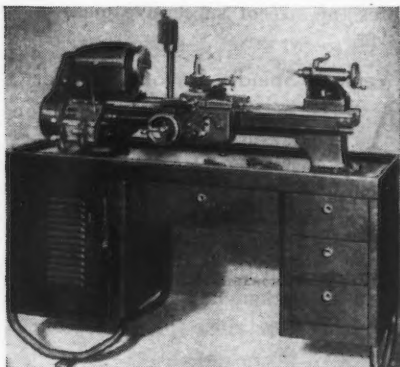


gearing and belting troubles are features claimed for the grinder. The transmission case is a complete drive unit, readily detachable from the machine. Two speeds are available and a built in hydraulic shock absorber eliminates the shock of table reversal.



Snagging Grinder

A HEAVY duty, double-end, snagging grinder has been developed by the *Standard Electrical Tool Co.*, 2505 River Road, Cincinnati 4. Interlocking speed control prevents overspeeding of the wheels. Power is transmitted through a multiple V-belt drive. There is shaft coupling for convenient renewal of the V-belts. The 30 hp. ball bearing motor is adjusted by an integral ratchet wrench for placing tension on the V-belt drive. Equipment includes adjustable spark breakers and eye shields.

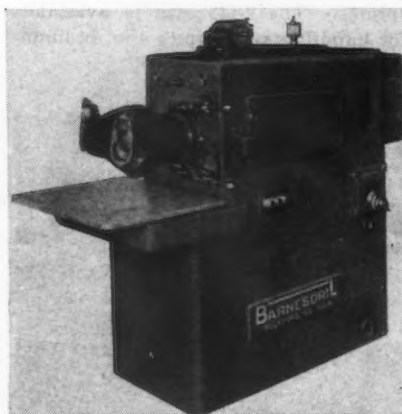


Cabinet Type Lathe

COMBINING all the features of the standard Logan quick change gear lathe in a compact cabinet, a quick change gear cabinet lathe has been developed by *Logan Engineering Co.*, 4901 West Lawrence Avenue, Chicago 30. The lead screw is held to within 0.002 in. lead error in 12 in. All moving parts and gears are completely enclosed. A multiple V-belt drive transmits power from the cone pulley to the spindle. The spindle is mounted on double row preloaded ball bearings.

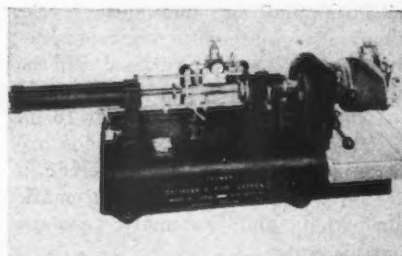
Piston Ring Lapper

A HYDRAULICALLY reciprocated piston ring lapping machine in cabinet form and a pneumatic bench type adaptation of it have been announced by *Barnes Drill Co.*, Rockford, Ill. The cabinet machine is the horizontal type with a hydraulically operated spindle having a false piston attached to carry a full set of rings during the lapping operation. Rings are compressed and the radial cylinder barrel is placed on the piston, releasing the rings to normal wall pressure. A loose abrasive is used and the machine is equipped with a mechanism to rotate the spindle (180 deg. in 12 in. of travel) on the forward stroke and to return without rotation. The machine is equipped with an automatic stroke timing mechanism and has adjustable spindle stroke up to 12 in. The machine also comes adapted for bench use.

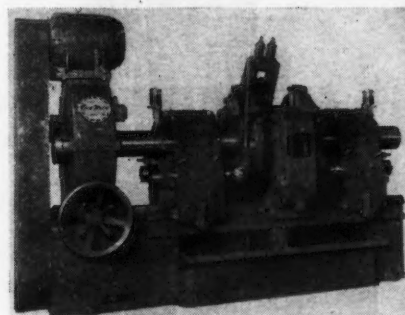


Piston Ring Lapper

Air operated piston ring lapper has been developed by *C. Allen Fulmer Co.*, 1217 First National Bank Building, Cincinnati. The machine is said to eliminate guesswork in fitting piston rings, to reduce "break-in" time from hours to minutes and to save tearing down engines because rings do not seal properly. The standard lapper will lap full sets of rings into their cylinder barrels up to a maximum bore of 6½ in. The machine gives a half revolution of the spindle on a full outstroke with no rotation on the return stroke. At each reciprocating



cycle, the spindle "hunts" so that there is no possibility of the abrasive traveling over the same path during the next stroke of the lapping operation. Working strokes are from 2 to 12 in.

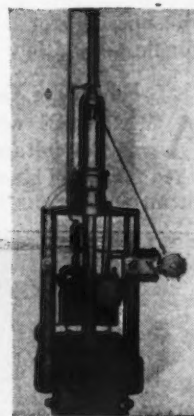


Drum Type Miller

A CONTINUOUS rotary drum type milling machine, the No. 1-A Roto-matic, has been announced by *Davis & Thompson Co.*, 6411 West Burnham Street, Milwaukee 14. A wide range of feeds is made possible through change gears. Desired speeds are obtained through the V-belt drive. For the particular application pictured, machining pump bodies, each head contains a roughing and finishing spindle having micrometric endwise adjustment. Finishing spindles have the added feature of 0.002 in. of toe cut in 6 in. of cutter face to eliminate back drag. Fixture has 12 stations.

Honing Machine

DESIGNED for rapid honing or lapping of aircraft cylinders to a high degree of accuracy and finish, a honing machine has been developed by *C. Allen Fulmer Co.*, 1217 First National Bank Bldg., Cincinnati. The machine produces straight, round, smooth bores to working tolerances as small as 0.0002 in. Because of its wide range of spindle and reciprocating speeds, the machine is said to remove material faster than any other known method for a comparable degree of accuracy and surface finish. It can be supplied in various working stroke lengths up to 72 in. and with cylinder honing capacities up to 20 in. in inside diameters. All controls have been brought down to floor level.





Remember them?

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It was a familiar sight during peacetime. Nowhere else in the world could you see its equal. . . . It was America on wheels — a nation going places in 30 million automobiles.

And we helped to build every one of them!

But that's not all. Look down that stream of cars all the way to the beginning . . .

Machine tools designed by Jones & Lamson have been used by the automotive industry ever since the first automobile. They helped to make possible the mass production of interchangeable parts which in turn has made possible millions of automobiles. They are now contributing to the greatest feat of wartime production that the world has ever known.

As the oldest machine tool company in America, there are no major industries and few important products, for peace or war, to which Jones & Lamson engineering has not contributed.



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Springfield, Vermont, U.S.A.

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.

Assembly Line

STANLEY H. BRAMS

• March comes in like a lion along the labor front with more than 40,000 idle in disputes over output standards and discipline . . . Firm stand is indicated by certain managements.



DETROIT—Coming events cast their shadow before. This production center has been having a taste of its postwar labor problems, and it is unpleasant and bitter broth indeed.

The chronology is not complicated. On Feb. 23 seven employees at the Dodge main plant were discharged for failing to meet production standards and for subsequent insubordination—the latter offense being the direct cause of the firings. A strike which began in their gear finishing department spread through the plant and closed it the next day. On Monday maintenance men joined the walkout, bringing the total involved to approximately 13,500. Inasmuch as interplant truck drivers were participating, last week saw stoppages, due to lack of parts, occur at Dodge Truck, Chrysler-Windsor, Chrysler-Highland Park and the Chrysler operated Tank Arsenal. Simultaneously another dispute closed the DeSoto plant. The total affected Chrysler workers by last weekend thus grew to 22,600.

Meanwhile, on Thursday of last week, Briggs Manufacturing Co. discharged six union stewards and one shop committeemen charged with fomenting strikes. Walkout immediately followed at the Briggs-Mack Ave. plant and spread to Briggs-Vernor, Briggs-Eight Mile, Briggs-Meldrum and Briggs-Milwaukee. Approximately 18,100 were affected.

So much for the chronology. The events themselves are not nearly as

significant as the situations which precipitated them and maintained them.

It was fairly evident that at least some managements in Detroit have reached the point where they intend to make a stand against what they maintain is unwarranted breakdown of discipline and inability to control production in their own shops. It is quite apparent that the embattled statements of the Automotive Council for War Production on this score a few weeks ago (*THE IRON AGE*—Feb. 22, 1945, p. 82) were indicative of this intention. The stand is being taken in the anticipation that once a return is made to prewar goods, where production standards are known and fixed, then management will be unable to reach its output goals unless it can depend on fair time standards in line with those prevailing before the war, but not today.

LABOR senses this, of course, and is as grimly determined to make its voice felt. In the cases of the seven discharged Dodge men, their gear shaving machines had been re-gearred with the result that output increases were possible. Previously the

standard was 108 pieces an hour and presumably was being maintained; after the new gearing a potential capacity of 225 pieces was claimed possible by the company. The rate was set at 184 pieces, or 80 per cent of the hypothetical capacity. The seven men who were let out were producing between 150 and 155 daily. The company position was that they were discharged for failing to report their production count for the day; the stand of the CIO United Auto Workers Union was that the work contract had been violated by discharges in the midst of a grievance.

The Briggs case is somewhat different, developing as it did over discharges of seven workers to whom evidence was said to point as instigators of previous strikes. Something of an error in judgment might have been manifested by letting these men out while another rather closely related plant, whose union local was closely tied by old association with Briggs Local 212, was on strike. But the Briggs management move thereby served to emphasize the more its determination to control its operations.

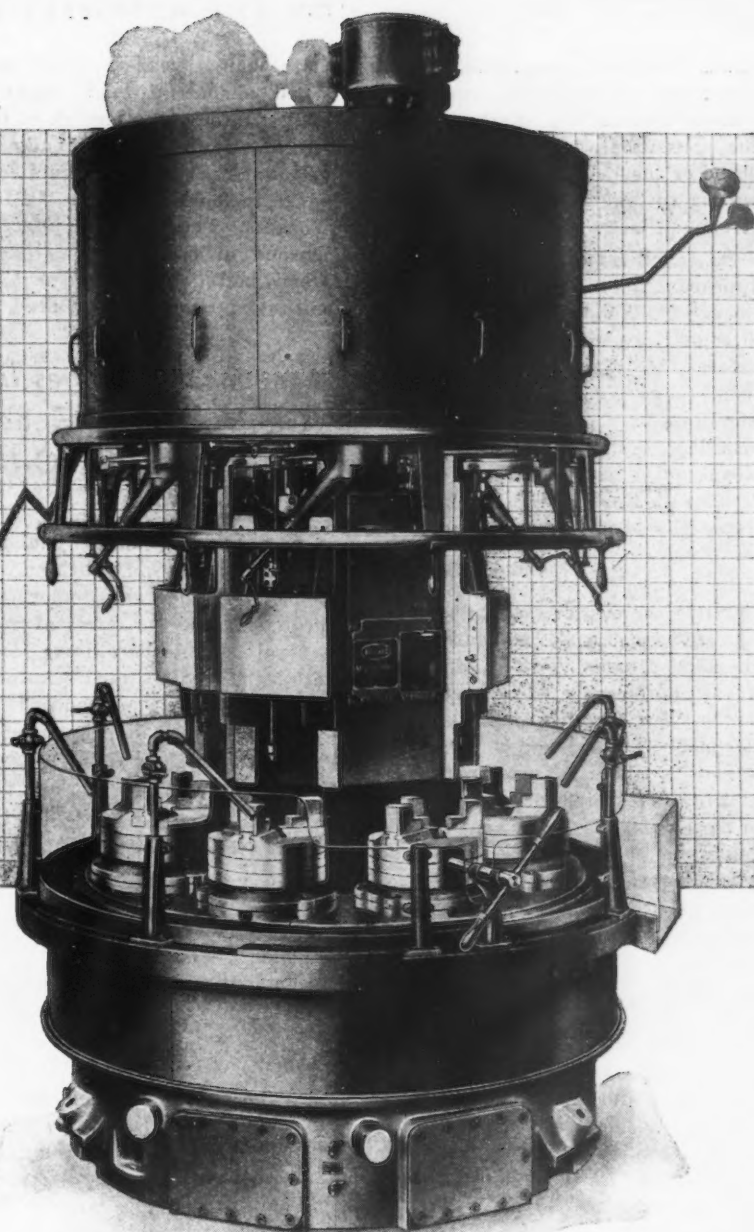
The walkouts underline another point—that the autonomy of the

ONE ON EVERY CORNER: Cpl. Charles Hein, Allentown, Pa., checks the tire of a jeep at the 29th Division service station in Germany. This station is believed to be the first of its type in Europe, specializing in service of the kind known only to peacetime America.



**EXTRA PUSH
In The Right Places
For
Severe Production
Schedules**

Bullard Type D MULT-AU-MATICS are available — with 6 or 8 spindles in 4 sizes for work up to 23" diameter.



Built to stand strains of high-speed, heavy-feed, tough-metal, long-run operations

Long life and maintained accuracy in multiple spindle mass production of all classes of castings, forgings and cut-off bar stock are assured by the extreme massiveness and rigidity built into the Bullard Type D MULT-AU-MATIC.

From the rugged base and sturdy carrier that guards alignment accuracy, up through the rigid column to the feed works that assure complete coordination of spindles, tool-carrying heads and indexing . . . this unified heavy construction is accurately controlled to meet every demand for efficient operation.

For complete details about the way the Bullard Type D MULT-AU-MATIC produces one finished piece (or two) within a few seconds of the time of the longest single boring, turning, facing, grooving or drilling operation, write today for Bulletin MAM-D. The Bullard Company, Bridgeport 2, Connecticut.



CREATES NEW METHODS TO MAKE MACHINES DO MORE

union locals and disagreement within the ranks of the union over strike policies weaken any effort to control the situation. The international board of the UAW was unable or unwilling to take steps to clear up the strikes all last week.

Its inability was evidenced in the appearance of secretary-treasurer George F. Addes, Chrysler regional director Norman Mathews, and others before the Dodge strikers, urging them to go back to their machines. Simultaneously the newly reelected president of Dodge Local No. 3, Mike Novak, also urged rather weakly a return to work. The strikers rejected the idea, and the board went into session.

THIS session was expected to result in possible appointment of an administrator for Local 3, but Novak promised to plead more strongly for a return to work. At a new mass meeting, however, the bandwagon in favor of continuing the strike was bearing down so heavily on Novak that he jumped on it rather than take the obvious alternative of being run over.

Novak himself has been generally represented as favoring modification of the no-strike pledge, in line with the Reuther faction to which he appears joined. The rank and file of Dodge back up this position. Against this attitude the presently conservative Addes wing had little chance to put over its ideas, and, in fact, has kindled resentment among the Dodge members by its determined, whipcracking opposition to the walkout.

This factionalism was further emphasized when Briggs strikers picketed the international headquarters of the UAW protesting the position of Melvin Bishop, their regional director and a member of the Addes side. Placards called for Bishop's removal.

Management people who hope that the factionalism thus displayed may split the union wide open are probably wrong, and probably fortunate if they are wrong. In the first place it has been the history of the past that regardless of the schisms within the strife-ridden UAW, the opposing sides close their ranks whenever their union is jeopardized. It is probably fortunate for industry that this is so, because if the union were to break open at the seams and divide, it would mean no less and no more than it did in 1938, when the auto workers fell apart under Homer Martin, spent

more than a year in bitter jurisdictional disputes which racked the plants unfortunate enough to be centers of arguments, and finally wound up almost completely reunited once more in one body, the CIO Auto Workers. The turmoil of internal dissension, difficult as it is, has been proved better than the turmoil of outward and temporary breakup.

Announces Changes In Contract With General Motors and CIO-UAW

Detroit

• • • Minor changes and recommendations, some of which may prove to be of considerable import in the future, feature the terms of the new General Motors bargaining contract with the CIO-United Automobile Workers Union, announced after about 18 months of negotiations and deliberations last weekend by the War Labor Board.

The board promised to institute an inquiry, to start March 22, into the bracket wage system opposed by the union and the basis of new job pay rates. Under this system rates are setup on a base determined by study of community rates, a procedure opposed by labor groups on the grounds that it upsets their cardinal principle of equal pay for equal work.

The board also recommended that President Roosevelt make a study to "include the problem of regularizing production, guaranteeing full employment and stabilizing earnings in the automotive industry." This approach to the guaranteed annual wage demand of the auto union was not expected, however, to provide any near term developments of significance.

More to the immediate point was the decision of the board that henceforth any retroactive pay awarded on grievances involving pay rates on new jobs would go back to the start of the grievance, rather than be limited to 120 days' pay.

Actual wage gains, limited by the Little Steel Formula, were held to an award, dating retroactively to Oct. 5, 1943, for 7½ per cent premium for third shift work, rather than the 5 per cent previously paid, and to a determination in a concurrent Fisher Memphis case on wage adjustments. The increased night bonus was estimated by officials to amount to about \$5,500,000 in back pay, and the Memphis case to about \$4,000,000.

The most significant of the non-economic demands gained by the union appeared to be the board's decision that seniority shall become a factor in transfers or promotions. This finding appeared to make it possible for the union to enter into grievance procedure on any personnel changes—something which obviously may impair what has previously been considered a managerial prerogative. The union stated that it will take the position that "length of service shall be the controlling factor" in transfers to better jobs.

The union also won the right to have its representatives move into the grievance procedure at an earlier stage than heretofore. Under the new contract they may come into the picture after failure of the second step of the procedure, when local committees of management and union have failed to agree on a dispute.

The board's determinations offered some solace on the grievance procedure to management as well. Henceforth an employee with a grievance must state his complaint to the foreman of his department, who may settle it then and there. Heretofore, the employee could simply say that he had a complaint and wanted the union committeeman to enter the matter. The company's position was that this situation made formal grievances out of minor matters which probably could be settled at once; the union's feeling appeared to be that it desired the committeeman's presence as a means of demonstrating the importance of the union to the worker.

General Motors won another point in obtaining a 15-day open period from the installation of the contract on March 5 during which workers may withdraw from the union if they choose. Thereafter, previous maintenance of membership provisions of the contract will apply.

The term of the new contract will be negotiated later. It replaces one which originally ran out Oct. 5, 1943, but which had been extended by mutual consent during the lengthy negotiation period.

Incentive Plan Approved

Chicago

• • • An incentive plan covering 2067 employees of Continental Foundry & Machine Co., East Chicago, has been approved for a 90-day trial period by the Sixth Regional War Labor Board. The plan covers 11 direct departments and one indirect service group.

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 PIPE CUTTER**
*To Step Up
 Your Production*

The photographs illustrate 2½" tubing—½" wall—9" length. Speed approximately 250 pieces per hour with one man cutting and loading. This machine long in use by Standard Tube Co., Detroit, Mich.



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Model "H"

Heavy Duty Roller Pipe Cutter

The essential machine for war effort. Fits right into the war program. Unsurpassed for cutting off pipes, tubes, locomotive boiler flues. Standard cage of rollers furnished with machine may be quickly removed and replaced by either larger or smaller cage of rollers, to give machine a complete range of from ½" to 6" inclusive. Standard equipment: standard cage of rollers 1½" to 4". Extra cage of rollers can be furnished for ½" to 1½" and from 4" to 6" pipe. On gauge bar, the steel faced gauge arm can be quickly clamped to cut any desired length of pipe. This machine provides clean cutting edge ready for subsequent operation. Accurate cut, both as to length and to squareness. Write or wire for complete information on this or larger machines.



Murchey also manufactures all types of Collapsible Taps, Self-Opening Die Heads, Thread Milling Machines, and Shell Tapping Machines. Write for literature on any or all of these products to Dept. 1.

MURCHEY MACHINE & TOOL CO.
 Detroit 26, Michigan

MURCHEY

Washington

L. W. MOFFETT

• Ordnance vehicle losses total 40,455 in European Theater since D-Day . . . Battle losses of all Ordnance items total over \$500,000,000.



WASHINGTON — Army Ordnance losses since D-Day in the European Theater of Operations for both United States Army Groups have recently been estimated as 6205 combat vehicles, 34,250 general purpose vehicles, 166,885 rifles and other small arms, 23,871 mortars and machine guns, and 75,245 binoculars, watches and compasses.

Damaged Ordnance equipment is declared a battle loss and written off as scrap only when it is no longer repairable or has been captured by the enemy. The majority of Ordnance losses in Europe have been in the first category.

Battle losses of the items cited total \$500,000,000 in American production f. o. b. Ordnance plants and factories in the United States. No account has been taken of thousands of other items and spare parts, nor of ammunition expenditures.

The dollar value of the battle losses ranges from \$600,000 for watches to nearly \$200,000 for tanks.

Loss rate for individual Ordnance items vary greatly. Items having the lowest loss rates are heavy trucks and artillery. Few of these have been captured by the enemy and field service greatly extends their useful life by replacing worn-out gun barrels, truck engines and other component assemblies.

Comparison of battle losses reveals lower actual loss rates for many items in December, when most United States forces were engaged in repelling the German counter offensive, than in

July, month of the successful drive out of Normandy. Where losses were double in December compared with July, numbers of weapons and vehicles employed were fully three times as great.

Enemy equipment captured or destroyed far exceeds total United States battle losses. For example, according to Ordnance reports, the Third United States Army has reported about twice as many Panzer tanks captured or known to have been destroyed as their own battle losses. In addition, General Patton's men have destroyed or captured 17 pieces of enemy artillery for every one lost.

In the first 26 days after the German counter-offensive was launched in mid-December, the equivalent of two Panzer divisions were reported destroyed by the First Army, including 239 tanks captured or knocked out.

Totals for the battle were as follows:

Tanks—destroyed, 225; captured, 14. Motor vehicles—destroyed, 627; captured, 114. Self-propelled guns—destroyed, 19; captured, 488. Anti-tank guns—destroyed, 19; captured,

4. Other artillery pieces—destroyed, 39; captured, 58.

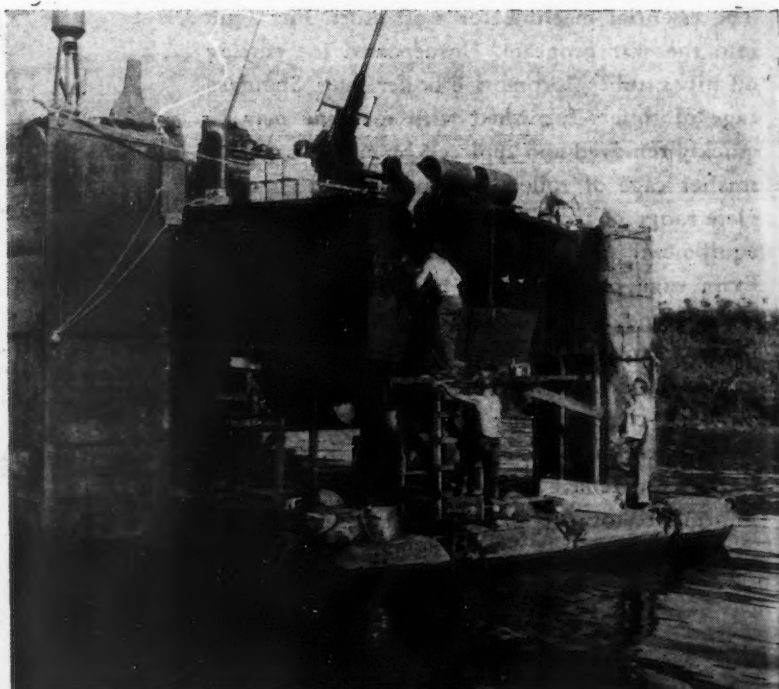
ALL knocked out German equipment that still remained inside the enemy-held salient was not taken into account on the above tally.

However, when the amount of Ordnance equipment that has poured onto the European continent is considered, battlefield losses pale into insignificance. In the first seven months following D-Day more Ordnance equipment and supplies were landed in Europe than had been previously built up in the British Isles over a period of two years.

Prior to D-Day, 2,000,000 long tons of Ordnance equipment, supplies, spare parts and ammunition were brought into the British Isles to equip United States forces scheduled to take part in the invasion.

From June 6, 1944, to Dec. 31, 1944, more than 2,000,000 long tons of Ordnance supplies were landed at the ports and on the beaches of Continental Europe. January, 1945, tonnage figures, when final totals are

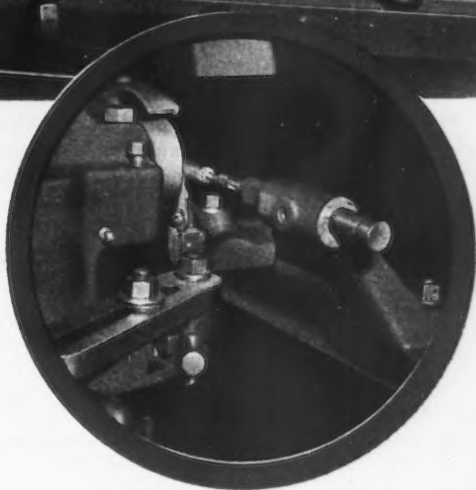
TIME OUT FOR REPAIRS: One of the Navy's PT boats is repaired in a floating drydock somewhere in the Philippines. Time is of the essence in such overhauls, as the PT's are in constant demand for action against the Japs.



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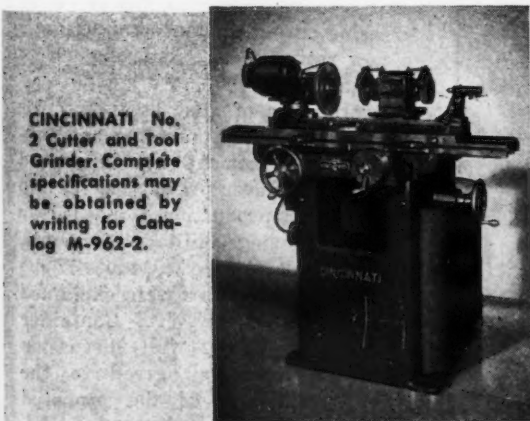
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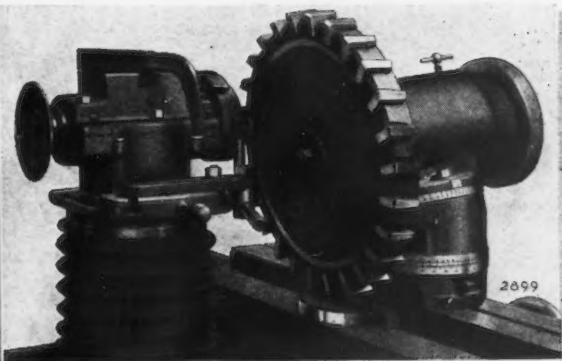


This machine has the capacity and versatility of adjustments for grinding a wide range of sizes and types of cutters. Two extremes are illustrated on this page. The grinding operation on the pencil sharpener cutter (above) shows an ingenious setup for a small cutter, while the face mill and attachment (below) is proof of the machine's capacity and ability to support a heavy load, yet the table can be moved with a light push of the finger.

Cutter sharpening men like this machine because it's so convenient to operate; the handy controls and adjustments enable them to do many sharpening jobs 15% to 25% faster. We'll be glad to send more information about the versatility and usefulness of the CINCINNATI No. 2 Cutter and Tool Grinder.



CINCINNATI No. 2 Cutter and Tool Grinder. Complete specifications may be obtained by writing for Catalog M-962-2.



Grinding the face of the teeth of a 16" diameter face milling cutter with the aid of the Face Mill Grinding Attachment.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

ROOM AND MANUFACTURING MILLING MACHINES...SURFACE BROACHING MACHINES...CUTTER SHARPENING MACHINES

tabulated, promise to break all existing records.

* * *

Ordnance government-owned contractor-operated ammunition plants throughout the country, operating under cost-plus-fixed-fee contract, representing an original investment of \$3,000,000,000, and covering a total area larger than the combined areas of New York, Chicago, Philadelphia and Detroit, detail impressive figures in manpower conservation and in increasing their output.

A report prepared by Ordnance, citing figures for November, 1944, as compared with July, 1943, indicates that:

Ammunition loading plants were producing 153 per cent more material with only 54 per cent more labor.

Smokeless powder plants were producing 66 per cent more material with only 48 per cent more labor.

High explosive plants were producing 56 per cent more material with 4 per cent less labor.

The ammonia plants, whose product is essential in all explosives manufacture, were producing 32 per cent more material with 22 per cent less labor.

As a practical illustration, Ordnance says that for 1000 rounds of artillery ammunition produced in July, 1943, the same volume of man-

hours produced 1610 rounds in November, 1944. For 1000 rounds of small arms ammunition produced in July, 1943, the same volume of man-hours produced 1390 rounds in November, 1944.

Although plants producing Ordnance material are turning out anywhere from 32 per cent to 153 per cent more material, the manpower increase from July, 1943, to Jan. 1, 1945, was 65,621 workers, an increase of 26 per cent.

* * *

Machine gun cartridges are being canned in hermetically sealed metal containers under a new process developed by the Army, to protect small arms ammunition against weather and other damage. The first lots of these canned bullets were rushed overseas about a month ago.

Special machinery is required for sealing the cans and applying a coating of camouflage paint. The new lightweight cans resemble one-gallon oil cans and are packed with caliber .50 cartridges in a metal-link belt or in pasteboard cartons. They are opened by a key similar to that used on food cans before the war, and, like food, the ammunition is kept clean, dry and undamaged until the container is opened in the combat area.

Machine gun and rifle ammunition,

after being inserted in cotton-web or metal-link belts or in pasteboard cartons, has previously been packed in wooden chests and leak-proof metal boxes. Exceptionally adverse climatic conditions and problems of transporting supplies experienced by combat forces occasioned the development of the new container.

* * *

"The small arms industry," according to Maj. Gen. L. H. Campbell, Jr., Chief, Army Ordnance, "has produced 19,000,000 caliber .30 cartridges. It has produced 8,500,000,000 caliber .50 cartridges, and 7,000,000,000 caliber .45 and carbine cartridges. In addition, it has produced 3,000,000,000 rounds of foreign calibers for Lend-Lease. This is an outstanding record for an ammunition industry which in 1939 employed only 5000 people. At maximum daily rate of output, it would have taken today's industry only 49 days to turn out all the ammunition produced in the United States for our forces in the first World War.

"As for machine guns, the small arms industry made 1,700,000 of the caliber .50 alone. Most of these were for aircraft. It has produced more than 11,000,000 rifles and carbines. Of these, more than 1,000,000 were Lee-Enfields for our British ally. It has turned out more than 4,000,000 pistols, revolvers and sub-machine guns. It has made billions of armor-piercing cores, belt links, rifle clips and brass cartridge cups. It has provided millions of pounds of powder, explosives, the finest steels, and other raw materials."

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Greater Production Of Steel Strapping Urged

Washington

• • • The WPB Steel Strapping Industry Advisory Committee at a recent meeting discussed means of increasing output of steel strapping and a new rating order regulating use of the material.

Overall use of steel strapping for car loading, baling, bundling and container reinforcement has increased several times over prewar usage, and still greater production is needed to satisfy growing military demands, WPB officials reported. Details of the proposed rating order were explained by members of the WPB Container Division and after full discussion committee members agreed to the general principles of the proposed order.

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**MANY CARBOLOY STANDARDS
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**CEMENTED
CARBIDES**

• WPB boss Krug descends on Boeing to jack up production . . . Coast manpower problems being helped by negotiated job transfers and flexible task forces.



SEATTLE—Boeing's failure to maintain scheduled production rates brought WPB's head man J. A. Krug out to the Pacific Northwest on a flying trip for a personal inspection. Krug arrived to investigate why the Seattle-Renton Boeing plants were the only ones in the nation to fall behind on the B-29 program.

Labor turnover is believed to be the chief trouble. Boeing has been hiring 3000 new workers monthly while an average of 2500 a month have been quitting.

Although Boeing has received top manpower priority rating and has been recruiting labor in 33 states, a severe housing shortage continues unalleviated. The Seattle War Production Council admits that there is immediate need for 2000 rooms and that by July the demand will mount to 5000.

The company shows a net gain in employment since January of 2000 workers principally recruited from out of state. The recruiting program has been narrowed down to five states in the West in the hope that local recruiting will ease the housing demand.

Prospects of an aluminum shortage which might interfere with production have been allayed by assurance from the Army that a sufficient sup-

ply would be made available to meet increased schedules.

* * *

Striking Seattle welders terminated a threatened tie-up of the two Todd shipyards resulting from the most recent flare-up between AFL welders and an independent welders, cutters and helpers local.

AFL boilermakers hold the collective bargaining contract with the Todd yards, but many of the welders also belong to the independent.

Local leaders of the welders and cutters group claimed that the union and the company had an understanding that members of their union would be laid off in small groups as employment diminished, and claimed discrimination. The AFL declared that the only firing lists were those of members delinquent in dues.

The perennial jurisdictional dispute subsided when the WLB declined to act during a walkout and the independent union received word that "high officials in Washington promised a complete investigation. . . ."

* * *

Shell casings shipped back from the battle fronts are being cast into ship propellers by the Doran Co., a local brass foundry. Casings are smelted and shipped to Doran in ingot form

who then casts them into screws weighing as much as 23 tons. The company is reputed to have made virtually all the propellers for the larger ships launched on the Pacific Coast since 1940.

* * *

Pointer-Willamette Co., at Portland, is combining critical war production with significant postwar prospects. The company, the world's largest builders of logging trailers, is going into production on a new piece of logging equipment called a "Skyhook." The equipment rides into inaccessible areas, picks up and delivers logs by means of an overhead cable-way. The operation is designed to save construction of private logging roads and railways.

* * *

Fruehauf Trailer Co. has purchased the Trombly Truck Equipment Co. in Portland. The new operators will continue to maintain the pioneer firm's service facilities and manufacture truck-trailers for the logging, mining, construction and hauling industries.

* * *

Effects of the growing rocket manufacturing program are being felt here. The Pacific Steel Foundry and the Crawford and Doherty Foun-

WELDING ON THE SPOT: *Welding holes and open seams at gas can and drum repair shop in Cherbourg, France. French children receive special certificates from General Eisenhower for bringing in all the gas cans that have been discarded as the Army moved forward.*



For Tool Room Accuracy



FOSDICK

Jig Borer

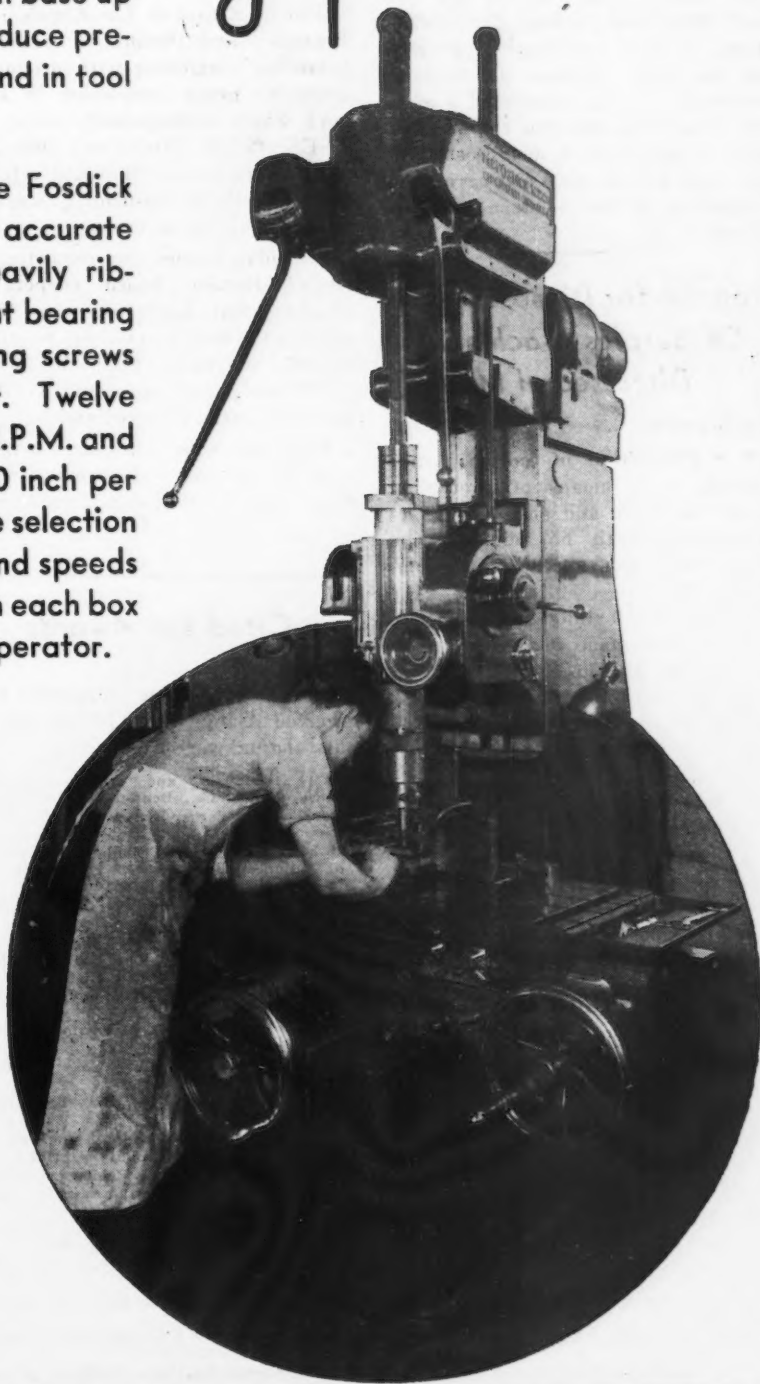
● The machine is ruggedly built from base up insuring the rigidity necessary to produce precision work required in tool rooms and in tool and die shops.

From a construction standpoint the Fosdick Jig Borer has all the essentials for accurate production. The sturdy bed is heavily ribbed to avoid distortion—three point bearing is provided for leveling and leveling screws for maintaining perfect alignment. Twelve speeds with a range of 60 to 1500 R.P.M. and nine feeds from .00125 inch. to .010 inch per revolution of spindle provide a wide selection of speeds and feeds. Both feeds and speeds are controlled by a single lever from each box conveniently located for the operator.

Illustrated is a Fosdick Jig Borer performing a precision boring operation in a mid-western tool and die shop.

The Fosdick Jig Borer is ideally suited to tool room and tool and die shop operations. It is adaptable to a wide range of precision operations at costs that are exceptionally low.

For your precision boring-reaming counterboring and similar work consult Fosdick. A Fosdick Jig Borer Bulletin J. B. 1. is available. Write for a copy.



FOSDICK

MACHINE TOOL COMPANY

CINCINNATI 23, ... OHIO

dry are producing component parts on the stepped-up ordnance program.

* * *

Approval of plans for the construction of a new office building to house the Schmitt Steel Co. occurred simultaneously with the award of a U. S. Maritime "M" to the firm for its share in manufacturing parts for 2000 ships. Prior to the war the plant fabricated products for bridges, dams, jetties, reclamation projects and railroads. William C. Schmitt, president, has been appointed a member of the committee for the Western States Council which met recently at Salt Lake City to map a program for integration of the western steel industry.

Program for Disposal Of Surplus Machinery Discussed at Meeting

Washington

• • • Utilization of normal trade channels as a means of protecting private business and stimulating re-employment, with no reimportation of machinery sold abroad was recommended by representatives of the American Roadbuilders' Association. The point was made at a recent meeting with the Surplus Property Board which was held to discuss the Association's 12-point program for the disposal of surplus new and used construction machinery.

On new equipment it was recommended that sales be made back to the original manufacturers and used equipment to distributors, with any sales outside these channels to be made preferably in small lots to small firms on competitive bids.

Federal, State and Local Governments, which have priorities under the Surplus Property Act of 1944, would, under the Association's recommendations, be restricted to amounts not exceeding their normal prewar requirements. Surplus spare parts, of which the armed services have bought large quantities, would be distributed one set with each machine sold, other quantities offered to the original manufacturers and the remainder scrapped.

The board said that it will consider the recommendations of the Association in the formulation of regulations affecting disposal of construction machinery. The Procurement Division of the Department of the Treasury, is the disposal agency under the board for construction machinery.

Worker Transferring Program Decreases Coast's Labor Needs

• • • Negotiated transfer plans for workers have decreased the Pacific Coast's overall manpower needs from 119,000 to 92,000 in the last two months, according to WMC.

Tried out first in Los Angeles, San Francisco and Phoenix, a method of balancing manpower with production schedules nears completion in Portland where management, union and USES officials interviewed 2000 laid-off workers in one plant and referred them directly to top-priority war jobs immediately on severance.

The plan, sometimes requiring Selective Service board cooperation, requires that employers give WMC notice of contract revisions requiring lay-offs of more than 50 people. USES and labor representatives then handle transfers immediately.

Turnover in the coast area dropped from 10 per cent in November to less than 8 per cent in January. Applied

to a labor force of 350,000 in the coastal states, this emphasizes, according to F. W. Hunter, regional WMC director, the continued necessity for strict observance of manpower regulations, including curbs on worker clearances and direct transfers into critical jobs.

In anticipation of a stepped-up production program scheduled to reach a peak in July, the coastal states may anticipate the need for a "flexible task force" to fill manpower needs anywhere in the area. With plans pending for even greater production in ship repair, airplane construction and production of munitions, shells and rockets, shifting labor demand is expected to reach its highest degree of fluidity in the coming months.

Boeing will require 5000 workers for B-29 construction in Washington. Nineteen thousand workers will be needed in northern California to staff military and Naval establishments, for ship repair, high-octane gas, railroads, cargo loading, radar and essential civilian services such as will be required by the forthcoming Four-Power Conference. Los Angeles and Long Beach areas will be short 25,000 workers for aircraft, heavy-duty tires and meat packing. San Diego's aircraft production is going to need another 5000. Forge, foundry, lumber and logging in the Pacific Northwest will demand another 7000 workers.

Nevada, actively re-entering the production picture, under impetus of the rocket program, took drastic steps in curtailing manpower in gambling houses, saloons, etc., in an effort to satisfy its call for another 5000 men.

Copper, lead and zinc quotas in Arizona have stepped up needs to 6000. Aircraft component parts, ordnance and mining hopes to draw on transient labor as well as less essential employees to fulfill its quota.

* * *

As Consolidated Vultee nears completion of the largest airplane ever designed, the firm's annual statement for the fiscal year ended in November, 1944, reveals gross sales of \$960,016,945, up almost \$160,000,000 from the preceding year. Earnings on the common stock amounted to \$12,424,313 or \$8.80 per share, up 13c. from 1943 after setting up a fund of \$18,500,000 for possible renegotiation adjustments. The firm delivered 131,000,000 lb. of airplanes in 1944 compared to 126,000,000 in 1943.

Cited for Awards

• • • The following companies have received Army-Navy "E" awards for outstanding war production:

Ross Carrier Co. and affiliate, Michigan Power Shovel Co., Benton Harbor, Mich.
Western Gear Works, Lynwood, Calif. (fourth star)
Brown Instrument Co., Philadelphia, division of Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. (third star)
Lapointe Machine Tool Co., Hudson, Mass. (second star)
Clark Equipment Co., Buchanan, Mich.
American Fork & Hoe Co., Ashtabula, Ohio.
Aurora Electric Co., Brooklyn.
Belden Mfg. Co., Chicago, and Richmond, Ind., plant.
Buchman Mfg. Co., Inc., Manayunk, Pa.
S. Buchsbaum & Co., Chicago.
Buckeye Fabric Finishing Co., Coshocton, Ohio.
Cole Electric Products Co., Inc., Long Island City, N. Y.
Denison Cotton Mill Co., Denison, Tex.
Economy Pumps, Inc., Hamilton, Ohio.
Energetic Worsted Corp., Bridgeport, Pa.
General Cable Corp., Buffalo and St. Louis plants.
General Products Corp., Jackson, Mich.
Grosfield House, Inc., Brooklyn.
International Silver Co., Factory "F", Florence, Mass.
Morris P. Kirk & Son, Inc., Los Angeles, Calif.
Marmon Herrington Co., Indianapolis, Ind.
Monburt Co., Brooklyn.
National Carbon Co., Inc., Charlotte, N. C.
New York Association for the Blind, Bourne Workshop, New York.
Remington Rand, Inc., Propeller Division, Johnson City, N. Y.
Rosco Mfg. Co., Minneapolis, Minn.
Rugg Mfg. Co., Greenfield, Mass.
Special Machine Tool Engineering Works, New York.

Meet the three sheet steel "Paint-Grippers"

These paintable surface-treated sheet steels suggest many new cost-saving, product-improving opportunities. Two of these special ARMCO PAINTGRIP sheet steels are given the definite rust protection of zinc coatings before they are Bonderized at the mill. Bonderizing neutralizes the chemical action of zinc on paint; it prevents premature flaking and peeling of the paint or enamel. Moreover, it eliminates all "makeready" costs before painting.

There are three ARMCO PAINTGRIP grades—a surface-treated sheet for every requirement. One of them is likely to "fill the bill" for you.



1



1. The ARMCO Cold Rolled PAINTGRIP "Man" has a light electrolytic "flash" of zinc under a Bonderized surface. He will draw, form, weld, and solder readily. His uniformly smooth surface insures a handsome appearance when painted. He is ideal for products that are not subjected to severe corrosive conditions. Before painting he resists rust during shipment and in normal storage conditions.

2



2. For utmost rust-protection in corrosive applications, the ARMCO Galvanized PAINTGRIP "Man" gets a full zinc coating and then is mill-Bonderized. Like others in the family, he takes paint readily and helps preserve it. His habits in forming operations are good, but if you want deep-drawing qualities you'll want to meet . . .

3



3. ARMCO ZINCGRIP-PAINTGRIP. He's the born-contortionist of the zinc-coated family. His forming and deep-drawing qualities are excellent; his full zinc coating clings tightly to seams and corners as well as flat parts. He takes and holds paint as well as the rest of the family. (For zinc-coated products that do not require painting, ARMCO ZINCGRIP without the PAINTGRIP treatment can be specified).

★ ★ ★

Write us for more information about these paint-gripping sheet steels. They can make your products look smoother and more attractive and make them last longer. Just address The American Rolling Mill Company, 3361 Curtis Street, Middletown, Ohio.

THE AMERICAN ROLLING MILL COMPANY

PERSONALS

• **Frederick P. Huston** of The International Nickel Co., Inc., New York, has been placed in charge of the Development and Research Division's railroad developments in application of nickel alloy steels and other nickel alloys. **Donald J. Reese** has resumed his duties with the division after having served in the Steel Division of the WPB since April, 1942.

• **A. J. Garipey**, who joined Lawrance Aeronautical Corp., Linden, N. J., as contracts and service manager in 1943, has been promoted to the position of assistant to the president.

• **John B. Fenstermacher** has been appointed special sales representative of The Ohio Steel Foundry Co., Lima, Ohio. Mr. Fenstermacher's headquarters will be in San Francisco.

• **G. E. DuCharme**, formerly sales manager of the New York district, has been appointed manager of paint and chemical containers sales, Continental Can Co., New York.

• **Edward J. Charlton**, since 1942 assistant to the president of Lukenweld, Inc., Coatesville, Pa., has been appointed manager, development engineering, for Lukens and its subsidiaries, By-Products Steel Corp. and Lukenweld, Inc. Mr. Charlton joined the engineering staff of Lukenweld in 1931 as a designing engineer, and continued in that capacity until his appointment in 1940 as general manager of Lukenweld, Inc.

EDWARD J. CHARLTON, manager, development engineering, Lukenweld Steel Co. and subsidiaries.



FRANKLIN R. HOADLEY, president, Farrel-Birmingham Co., Inc.

• **Franklin R. Hoadley** has been elected president of the Farrel-Birmingham Co., Inc., Ansonia, Conn. Mr. Hoadley has been associated with the company since 1914. He became foundry manager in 1919, and in 1930 was elected vice-president and a member of the executive committee.

• **Frank G. Flocke**, for the past 15 years a member of the Technical Service, Development and Research Division, The International Nickel Co., has been made general manager of the Trent Tube Mfg. Co., East Troy, Wisc.

FRANK G. FLOCKE, general manager, Trent Tube Mfg. Co.



• **B. A. Gillies**, for the past ten years vice-president of Grumman Aircraft Engineering Corp., has been appointed assistant to the president of Ryan Aeronautical Co., San Diego.

• **William F. Clark** has joined the Weinman Pump & Supply Co., Pittsburgh, as chief engineer, succeeding **M. C. Wemple**, resigned.

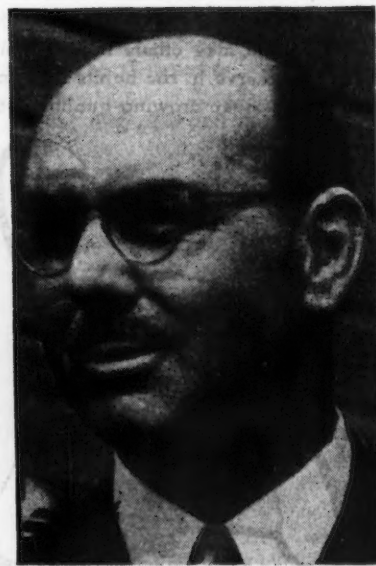
• **Thomas H. Kepner**, formerly staff supervisor of the Manufacturing and Repair Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been transferred to the Emeryville, Calif., plant as production and procurement supervisor.

• **Helen Ferguson**, affiliated with the Clayton & Lambert Mfg. Co., Detroit, for 27 years, has been elected secretary-treasurer.

• **Henry F. Davis** has been made purchasing agent and **H. J. Osborne**, assistant purchasing agent, Continental Gin Co., Birmingham, Ala.

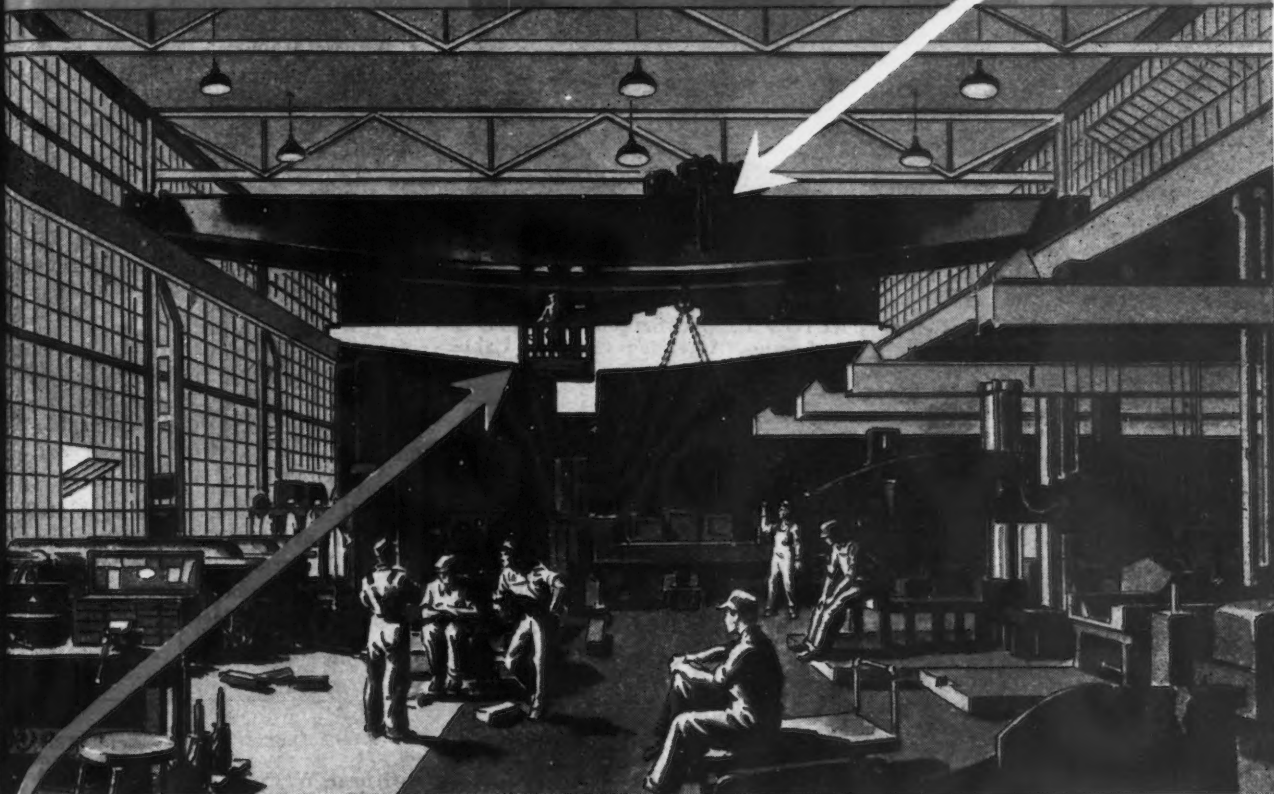
• **Thomas J. Bannan** has been elected president of Western Gear Works, Seattle, and also of its associate plant, the Pacific Gear and Tool Works of San Francisco. Mr. Bannan, who has been executive vice-president of the companies for a number of years, is also president of the Webster-Brinkley Co. and the Hallidie Machinery Co. of Seattle. **Berchman A. Bannan** has been elected vice-president; **Philip L. Bannan, Jr.**, treasurer, and **Charles F. Bannan**, secretary.

THOMAS J. BANNAN, president, Western Gear Works.



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Northern CRANE

Would Save Them

Maybe they wait only a few minutes—but if they do it many times a day, plenty of man hours are lost—and you pay for them.

Moreover, the whole production schedule is slowed—time is lost everywhere—costing money and impeding your part of the war effort.

An extra Northern Crane on the runway will save all these countless minutes now being lost. Also, if you

have an extra crane you need not fear breakdown—it won't tie up your shop.

Investigate the time saving possibilities of an extra crane.

Northern Cranes are fast, powerful, strong, have fine control. They are the fine machine tools of material handling.

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OFFICES IN PRINCIPAL CITIES

• **G. R. Limestahl** has succeeded **W. J. Pfaff** as superintendent of production at Plant 3, **Mullins Mfg. Corp.**, Salem, Ohio. Mr. Limestahl joined the company's Plant 2 in 1929, later becoming production manager at Plant 3.

• **Dan C. Swander** has been elected chairman of the board of **The Columbian Vise & Mfg. Co.**, Cleveland. **Harold F. Seymour** has been elected president; **Dan C. Swander, Jr.**, vice-president; **Albert F. Munhall**, secretary-treasurer.

• **W. V. Walkinshaw** has been appointed manager of industrial sales, **Westinghouse Air Brake Co.**, Wilmerding, Pa., succeeding the late **Roland G. Justus**. Mr. Walkinshaw joined the company in 1939 as a mechanical expert at St. Louis, later becoming industrial sales representative in the southwestern district.

• **Stuart A. Loveridge**, formerly field sales manager, has been appointed purchasing agent for **The Autoyre Co.**, Oakville, Conn.

• **John H. Penfield** has been named field service engineer in southern Connecticut for the **Rustless Iron & Steel Corp.**, Baltimore.



ALTON P. HALL, general manager of sales, **American Chain & Cable Co., Inc.**

• **Alton P. Hall** has been appointed general manager of sales, **American Chain & Cable Co., Inc.**, Bridgeport, with headquarters at New York. Mr. Hall joined the company a year ago as assistant general manager of sales after having been with **Bethlehem Steel Co.** for 22 years.

• **Frank W. Gower** has been made superintendent of the **Demers Machine Products Co.**, Worcester, Mass.

• **Leonard C. Blevins** has been appointed sales manager of the Meter Division, **Westinghouse Electric & Mfg. Co.**, East Pittsburgh, Pa. **H. L. Buechner** succeeds Mr. Blevins as wathour meter sales manager.

• **William H. Welsh**, assistant traffic manager, **Youngstown Sheet & Tube Co.**, Youngstown, Ohio, has retired after serving the firm continuously for 36 years.

• **R. J. Benkart** has been appointed representative for **Ajax Electric Co., Inc.**, Philadelphia, in West Virginia, western Pennsylvania and southeastern Ohio.

• **N. B. Cappel**, formerly associated with the **U. S. Steel Supply Co.**, has joined the **Universal Steel Co.**, Cleveland.

• **R. B. Ranson** has been appointed manager of the New Haven office, **General Electric Co.**, Schenectady, and **J. J. Pascher** has been named manager of the Hartford office.

• **W. H. Ridgway**, 88, president of **Craig Ridgway & Son, Co.**, Coatesville, Pa., and founder and president of the **American Iron and Steel Institute**, died recently.

• **Charles S. Thomas**, 76, founder of **Empire Iron & Steel Co.** and **DeForest Sheet Tin Plate Co.**, Mansfield, Ohio, died recently.

• **Karl C. Krebsner**, 57, vice-president of **Kingston Products Corp.**, Kokomo, Ind., died recently.

• **Albert S. Bonner**, 53, president of the **Clark Equipment Co.**, Buchanan, Mich., died February 8. Mr. Bonner entered the Clark employ in 1915. He was elected secretary-treasurer of the company in 1924, a director in 1925, executive vice-president in 1938 and president in 1942.

• **Ernest J. Poole, Jr.**, 48, vice-president in charge of manufacture and a director of the **Carpenter Steel Co.**, Reading, Pa., died February 19.

...OBITUARY...

• **Henry S. Evans**, 61, president, **Central Iron & Steel Co.**, Harrisburg, Pa., died February 25. Mr. Evans joined the company in 1915 as superintendent of the plate mill department, and in 1923 was made general superintendent. He became vice-president and chief executive officer in 1939 and president in 1941.

• **Frank A. Frey**, 56, president and treasurer of the **Geuder, Paeschke & Frey Co.**, Milwaukee, died February 14. Mr. Frey joined the company, which was co-founded by his father, in 1913. He was made executive vice-president and treasurer in 1935 and advanced to the presidency in 1939.

• **John R. Hagemann**, 44, manager of engineering in the steam turbine department, **Allis-Chalmers Mfg. Co.**, Milwaukee, died February 15.

• **George W. Cobb**, former vice-president of the **American Can Co.**, New York, died February 27. Mr. Cobb was 72 years old.

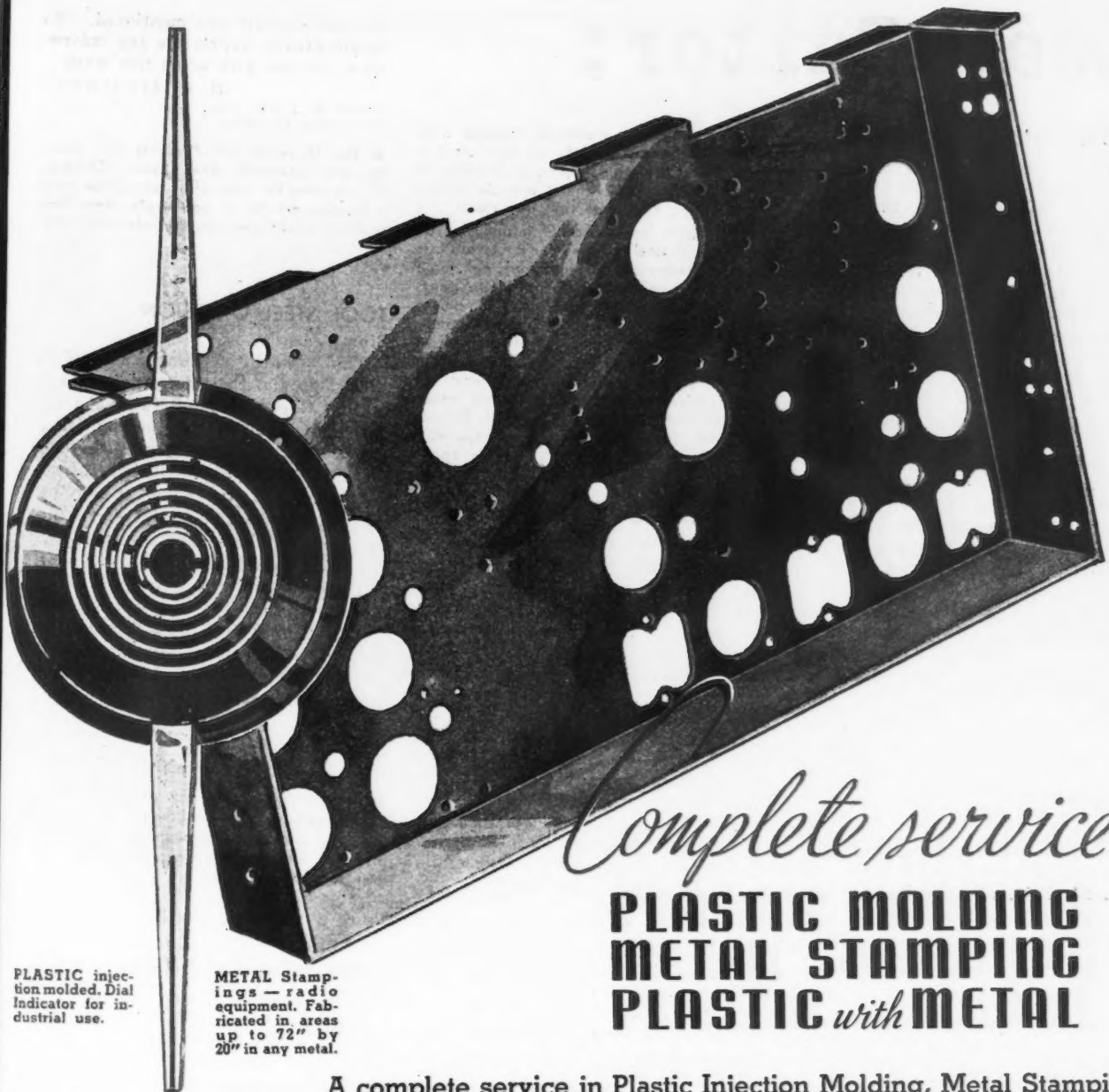
• **Edgar T. Clapp, Sr.**, president of the **C. & N. C. Mfg. Co.** and vice-president of the **National Alloys Co.**, Detroit, died February 24.

• **Robini F. Merrill**, vice-president of the **E. R. Merrill Spring Co.**, New York, died recently.

• **G. A. Bahler**, former general traffic manager at **Caterpillar Tractor Co.**, Peoria, Ill., died February 16.

• **W. B. Hoffman**, traffic manager of the **Alan Wood Steel Co.**, Conshohocken, Pa., died February 23.

• **Morris G. Himoff**, secretary of **Morey Machinery Co., Inc.**, New York, died recently. Mr. Morris had been a member of the firm since its inception, more than 30 years ago.



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Dear Editor:

METRIC SHIFT FEASIBLE

Sir:

Although the meter is the official standard of length in the United States, we do not use the metric system of measurement. But we do use metric for money, and a great many of our industries have switched to metric standards to save time and increase accuracy. Our radios are tuned to metric waves, doctors write prescriptions to metric and the electricity we use is measured metrically. Educators estimate that a switch to the metric system would save at least a year of time spent by children learning fractions.

By adoption of the metric system there would be no need for the use of numbers for sizing shoes; gages for shotguns and wire; calibres for rifles; carats for stones and gold; penny for size of nails. We could work into the metric system gradually, and conversion tables could be used widely. Tape lines and rulers could be made for a time with the metric system on one side, and feet and inches on the other.

EDWARD P. STAHL

401 E. Maple Ave., Newark, N. Y.

CONTINUOUS CASTING

Sir:

We have seen articles from THE IRON AGE of April 4 and 11, 1940, and Feb. 24, 1944, on "Continuous Casting," and should like to obtain further details of the processes. In particular, we should like to get in touch with the Continuous Casting Corp., New York, who it is stated hold the patents for the Eldred process.

C. C. ROBINSON,
Works Manager

Yorkshire Copper Works, Ltd.,
Leeds, England

● The Continuous Casting Corp. is no longer in existence and the Eldred patents are held by a group of companies, the major one being the American Smelting & Refining Co., 120 Broadway, N. Y. Licensing under these patents has been frozen during the war.—Ed.

STEEL REFERENCE

Sir:

We are searching for a publication that will furnish the purchasing department with a composite reference on steel. Information is needed on what steels are suitable for designated applications, how steel is rolled, what sizes are standard, what carbon contents are standard, what special carbon contents can be obtained and other information needed for the purchasing of steel. Can you recommend one?

CHESTER NORSTROM,
Purchasing Department

Superior Sleeprite Corp.,
2219 S. Halsted St., Chicago 8

● The Steel Products Manual published by the American Iron & Steel Institute, Empire State Bldg., N. Y., provides information on

size and analysis standards, special sizes and special analyses. As to how steel is rolled, The Making, Shaping & Treating of Steel published by the Carnegie Illinois Steel Corp., Pittsburgh, will be helpful.

There is no one source of information on the type of steel required for a certain use. Many different steels might work well for a particular application. The ultimate selection would depend upon the equipment which the fabricator has, and perhaps minor usage requirements. In attempting to arrive at the selection of material for a given product you must necessarily take into account price, weight, strength and other physical and mechanical properties. Ferrous and nonferrous producers are only too willing to be of service in any specific application.—Ed.

RECLAIMING TOOL TIPS

Sir:

In the article "Ford Reclaims Tungsten Carbide Chips," from THE IRON AGE, July 15, 1943, several points are not clear. What causes the brownish color of the titanium and tantalum carbide chips in a hydrogen atmosphere furnace at 1650 deg. F.? Wouldn't there be oxidation of all carbide chips at a temperature of 1000 deg. F. in the cooling zone? How are the separated tantalum and titanium carbide chips utilized? For what percentage of cobalt is a temperature of 2760 deg. F. designated for final sintering? Please furnish more details of the Bradley hammer used for pulverizing.

I. KRASNOKUTSKY,
Engineer

Government Purchasing Commission
of the Soviet Union in U. S. A.
3355 16th St., N. W., Washington

● The formation of the brownish color on the surface of some carbide chips in a hydrogen atmosphere is caused by the affinity of titanium for oxygen. A very small quantity of oxygen present in the hydrogen atmosphere is sufficient. The cooling zone temperature of 1000 deg. F. is considered too hot, as the chips would oxidize at that temperature. Room temperature or a little above would be best.

There are probably other methods of sintering which would recover tantalum and titanium carbides after they are heated in the hydrogen atmosphere furnace, but to our knowledge there has been no experimental work on it because there is so much tungsten carbide to salvage, and so little titanium and tantalum that technical manpower has not been assigned during the present shortage. A temperature of 2760 deg. F. is designated for the final sintering regardless of the percentage of cobalt in the alloy.

Detailed drawings of the Bradley hammer die are on file at Ford Motor Co. Details of the hammer may be obtained from the manufacturer, the C. C. Bradley Co., Syracuse, N. Y.—Ed.

VANADIUM IN ASPHALT

Sir:

On the News Front page for Jan. 10, the production of vanadium from

Russian asphalt was mentioned. We should greatly appreciate any information you can give us on this work.

H. F. HAMACHER

Arthur D. Little, Inc.,
Cambridge 42, Mass.

● The Universal Oil Products Co., Joliet Rd. and Lawndale Ave., Lyons, Chicago, Ill., reported the item after translation from a Russian article. If you wrote them they could no doubt give you the reference.—Ed.

TOOL STEEL OMISSION

Sir:

The "Chart of Comparable Tool Steels" in the Feb. 1 issue, prepared by Rolf G. Sartorius of National Lock Washer Co., meets the demand for a clear comparison of tool steels and provides data on applications and heat treatments. However the list is by no means complete and products of some tool steel suppliers have been omitted. We are the sales agent for Uddeholms A/B of Sweden, whose products were distributed until the outbreak of war. Since then tool steels have been manufactured here to our specifications and we have endeavored to maintain the former quality standards.

ERIK V. ENEVIK,
First Vice-President

Uddeholm Co. of America, Inc.,
155 E. 44th St., New York 17

● There is no reason why your tool steels should not have been published in this chart. But Mr. Sartorius compounded his chart primarily for use by his company. We regret this omission.—Ed.

EVERY WEEK SINCE 1872

Sir:

We wish to continue to receive the index to each volume of THE IRON AGE. Our collection of this publication dates back to 1872 and it is frequently used by our readers.

WALTER A. R. PERTUCH,
Librarian

The Franklin Institute,
Philadelphia 3

NONFERROUS ALLOYS

Sir:

Please send us four copies of your booklet on "Nonferrous Alloy Specifications."

M. S. DANISCH,
Chief Engineer

Utah Radio Products Co.,
812 Orleans St., Chicago

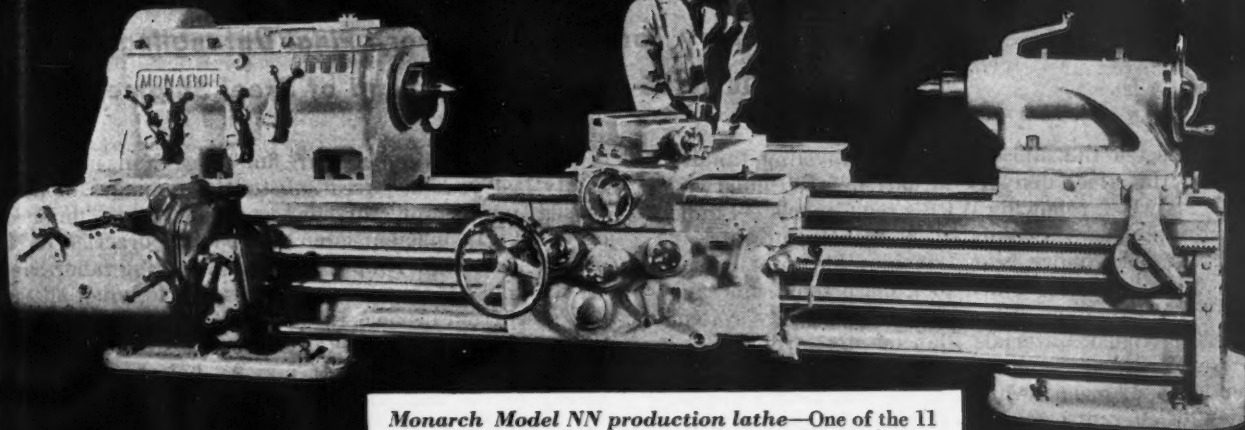
Sir:

Please send us 20 copies of "Nonferrous Alloy Specifications" booklet.

M. H. RANDAU

Chase Brass & Copper Co.,
433 N. Second St., Milwaukee 3, Wis.

● These reprints from the Sept. 14 issue of Iron Age are available at 25c per copy; in quantities of 5 or more, 16c per copy.—Ed.



Monarch Model NN production lathe—One of the 11 sizes and types of Monarch standard production lathes, which, with 6 toolmaker's lathes and other special feature lathes, comprise the widest and most versatile line of turning machines available to industry.

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801 Fisher Building
Phone: Trinity 1-0426

INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

This Industrial Week . .

- **WPB and Steel Industry Begin Order Housecleaning**
- **More Delivery Tangles Seen Before Final Untangling**
- **Order Volume 35-50 Per Cent Ahead of Steel Shipments**

AS expected the difficult job of unraveling tangles in the steel delivery situation was underway this week, following WPB's request to steel mills to eliminate orders invalidated by adjustments in war programs. This move bears considerable resemblance to the house cleaning which took place some time ago when the WPB changed over from the priority system to the Controlled Materials Plan on steel orders.

Despite the attempt now underway to clear mill order books of orders which are not considered urgent in view of current events, directives, although slightly lower in volume than a month ago, were still this week reaching mills in substantial quantities. Judging from past experience the straightening out of order books so that carryovers are reduced and so that delivery promises really mean something to the consumer, will be no small task and may take considerable time. Until this move is carried to completion a certain amount of confusion will probably have to be accepted with patience by the WPB, the steel industry and its consumers.

The announcement that second quarter allotments to the Office of Defense Transportation would be cut by 30 per cent and that heavy cuts would be made in other civilian programs, has as yet not been felt on steel mill schedules for that period. Mills in some districts holding a heavy volume of railroad orders have thus far received no cancellations reflecting the cut in allotments. It is expected that the latter will be made official at the fabricating level in the near future.

One difficulty carbuilders will have in accepting the cut for second quarter car construction (from 13,500 to 7500 units) will be to straighten out with WPB scheduling officials the question of which cars are to be eliminated. Unless steel mills receive such notification soon, April rolling schedules will be so firmly crystallized that difficulty will be encountered in lifting out eliminated tonnages and replacing them with material of a different sort.

REFLECTING the complications in the reshuffling of steel deliveries for the second quarter, is the problem of steel users who have placed advanced orders for certain types of material to dovetail with material from inventory in order to carry out a long-range program laid out many months ago. Although the actual number of tons received may be sufficient to produce a specified number of product units, some of the material may be about as useful as several left-handed mittens with no chance of getting the right-handed ones.

While the steel industry faces more tangles before the decks are finally cleared on the delivery situation, the spectre of reduced finishing steel operations, because of manpower shortage, is rapidly becoming a fact. In recent weeks headway has been made in stepping up raw steel output but this laudable achievement is now threatening some mills with a surplus of ingots because finishing mills cannot keep up with the primary mills pace.

One mill with greater finishing than ingot capacity last year acquired substantial tonnages of purchased ingots for further conversion into finished products. Insufficient labor caused this practice to be abandoned. Now it appears that dwindling labor supply will make it impossible for this mill to finish all the raw steel from its own furnaces. The only way out of this predicament will be a cutback in steel ingot production, so that the latter may be balanced with the ability of the mill to produce finished steel products. The experience of this company is indicative of a similar trend at other steel plants.

Some steel mills are frankly fearful that there is a possibility of the finishing department bottleneck causing them to be unable to fill on schedule the sharp increase expected in shell steel output. In the case of some major producers a step-up aimed to bring June shell steel rollings 80 per cent above January levels has been ordered by the WPB. Added to these troubles is the inability, so far, of WPB to find a home for close to 400,000 tons of sheets.

ORDER volume continued this past week at a high level, which was close to the record breaking average maintained since the start of the year. Most companies were receiving new business at a rate substantially above shipments—this being partly due to the heavy influx of new and upgraded directives. Some companies were reporting orders coming in at a rate of from 35 to 50 per cent greater than shipments.

Some sources believe that steel received a setback when the Federal Public Housing Administration directed that the 30,000 British rehabilitation dwellings ordered in this country be constructed of wood. Original plans had involved the use of steel sheets, and although bids based on designs using alternate materials were acceptable, it is believed that FPFA's decision eliminates the chance of steel being used in this particular project.

Railroad inquiries include 500 to 1000 42-metric ton box cars for the Paulista Railway of Brazil and 100 50-ton hopper cars for the Clinchfield Railroad. The Florida East Coast Railway Co. is seeking ICC approval on an order for 15 locomotives.

Steel ingot output remains unchanged this week at 95.5 per cent of capacity. Pittsburgh operations are up one point to 92 per cent from last week's revised rate of 91 per cent. Other districts showing production pickups are Chicago, up one to 101 per cent; Wheeling, up one to 93 per cent; Detroit, up half a point to 98 per cent. Cleveland operations are down one point to 97 per cent from last week's corrected rate of 98 per cent. The swollen Ohio River is responsible for the 10-point drop in Cincinnati output to 91 per cent. Steelmaking in the Western District is off half a point to 90.5 per cent. Philadelphia at 97; Buffalo at 104.5; Birmingham at 99; St. Louis at 94.5, and the Eastern District at 95 continue unchanged.

• **STEEL EXTRAS REVISION**—Now that the steel industry has already had one interim price increase and is scheduled soon to get another one based on realistic cost studies, friends of the industry believe now is the time to begin to overhaul its antiquated methods of applying steel extras. Many in the industry have had this in mind for some time, but because of war pressure and other factors, it has been labeled unfinished business. With the OPA showing unusual searching analyses of steel cost data before making price revision recommendations, it is a foregone conclusion that steel extras will be submitted to the same glaring spotlight. Many steel extras have grown up like Topsy. Because of changing conditions, extras for many items no longer bear a resemblance to the actual facts, but in just as many cases, steel companies have been forced by circumstance to perform services for which they are not compensated in the delivered price. With the OPA Steel Advisory Committee permitted to talk price in the presence of OPA representatives, now would be a good time to renovate and put on a realistic basis the entire system of steel extras.

• **STRUCTURAL STEEL ORDERS**—January bookings of fabricated structural steel for bridge and building construction, reported to the American Institute of Steel Construction by companies representing 74.9 per cent of the total average bookings of the industry during the years 1923-1925, totaled 39,590 tons as compared with 37,004 tons reported for the preceding month and 45,109 tons reported for the corresponding month of last year. Reported shipments for bridge and building construction totaled 42,031 tons compared with 35,163 tons reported for the same month last year. The reported tonnage available for future fabrication on Jan. 31 was 124,412 tons.

• **FORD ARMOR PLATE**—The Ford armor plate mill, inactive since last summer, is expected to be reopened to help fill requirements for the recently enlarged tank program. The reopening, however, will not be of long duration.

• **SURPLUS SALES POTENTIAL**—Future sales of steel surpluses are assuming an almost mysterious nature as voices thick with accent make inquiries of the Reconstruction Finance Corporation. Evidently from the character of the inquiries, persons new in the steel business are becoming interested, and some sources assert that Latin America is interested in large scale imports. Most interest

is shown in the surpluses located in the eastern United States. *

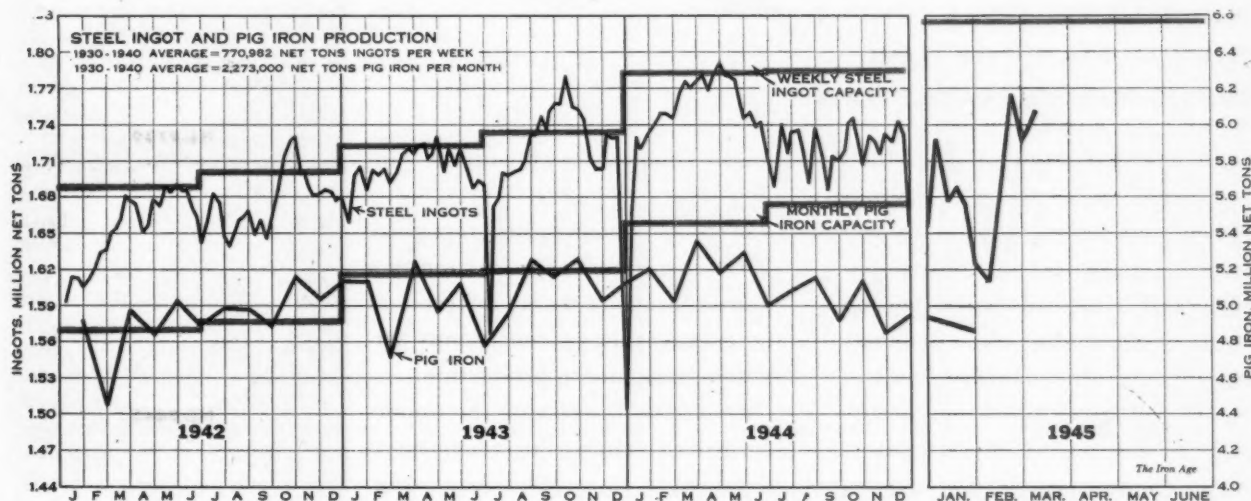
• **BOX CAR SHORTAGE**—Empty box cars are trickling into Chicago from the East far below the anticipated rate. Receipts at the Chicago gateway are still less than 500 a day, despite attempts by the ODT to have eastern roads deliver empties at the rate of 1000 a day through Chicago, 350 through St. Louis and 50 through Peoria.

• **CURFEW GETS RESULTS**—Whether or not it saves any coal, the midnight curfew to date has resulted in a sharp drop in police activity at Chicago in the early morning hours and, according to the Manpower Commission, has swollen the supply of available casual day labor. Hiring of day labor on Chicago's "Skid Row" jumped from 638 men the day before the curfew became effective to 1500 the following day and 2100 the succeeding day, according to U. S. Employment Service reports.

• **ALLOY STEEL OUTPUT UP**—Alloy steel production in January totaled 907,896 tons, a gain of almost 60,000 tons over the 848,274 tons produced in December, according to the American Iron & Steel Institute. In January 1944, production of alloy steel totaled 919,017 tons.

• **SMALL AMMUNITION BOXES**—With U. S. ground forces expending in one month over 70 per cent more small arms ammunition than in the entire year of 1918, American Can Co. production will be doubled this year on specially designed metal boxes used to encase carbine and machine gun ammunition for field distribution. Present production schedules call for approximately 18,000,000 of these containers in 1945, according to the company.

• **RAILROAD STRIKE**—Two work stoppages last week closed Indiana Harbor plant of Youngstown Sheet and Tube Co. and resulted in loss of approximately 10,000 tons of ingots. The disputes were an outgrowth of union demands that two men be employed in the cab of a new diesel plant locomotive, with 79 engineers and firemen walking off the job Monday. Work was resumed Tuesday, but another stoppage occurred from Wednesday midnight until Friday morning. Approximately 6400 workers at the plant, which is in the jurisdiction of United Steel Workers Local 1011, were idle. The dispute has been referred to the War Labor Board.

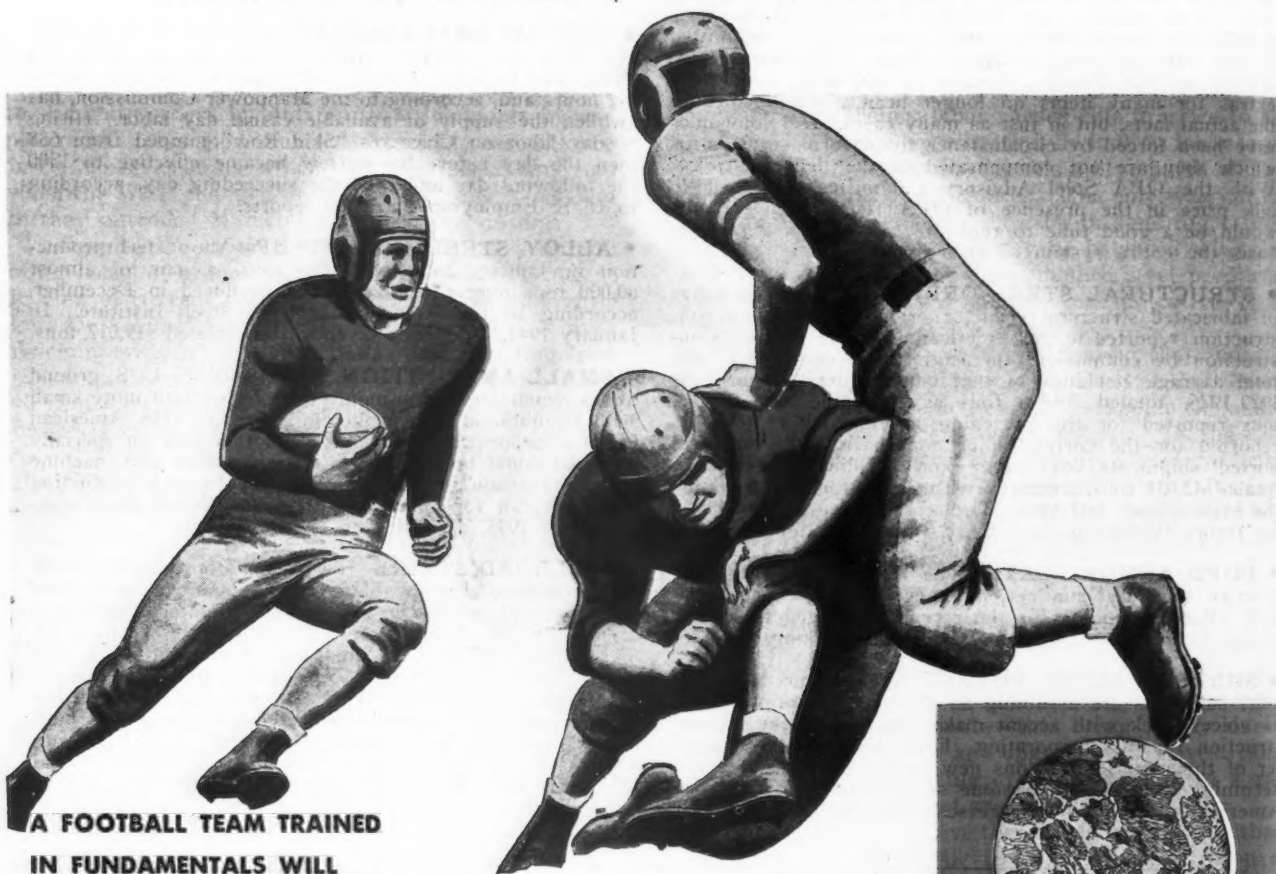


Steel Ingot Production by Districts and Per Cent of Capacity

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|-------------|------------|---------|------------|--------------|-----------|---------|----------|-------|---------|------|------------|-----------|------|-----------|
| February 27 | 91.0* | 100.0 | 92.0 | 97.0 | 98.0* | 104.5 | 92.0 | 99.0 | 97.5 | 91.0 | 101.0 | 94.5 | 95.0 | 95.5 |
| March 6 | 92.0 | 101.0 | 90.0 | 97.0 | 97.0 | 104.5 | 93.0 | 99.0 | 98.0 | 90.5 | 91.0 | 94.5 | 95.0 | 95.5 |

*Revised

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IN FUNDAMENTALS WILL
EVENTUALLY WIN OVER TEAMS
RELYING ON RAZZLE DAZZLE PLAYS**

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Fear Farm Implement Quota Cut May Peril Country's Food Production

By CHARLES T. POST

Chicago

• • • Controlled Materials sufficient for production at only 60 to 65 per cent of current farm equipment quotas will be allotted producers for the second quarter and possibly for succeeding quarters, it is indicated.

Current farm equipment production levels are below the minimum indicated by War Food Administration as being necessary to maintenance of food production. If the second quarter allotment cut, which WPB is understood to have indicated to WFA as imminent is carried out, equipment production will take a still steeper drop.

Effect of the materials cut on equipment production would be felt most heavily in the industry's next production year under WPB Limitation Order L-257. Lack of some second quarter materials may also restrain the industry as it comes into the stretch of the current production year behind schedule on many products.

Barring the end of the European War, prospects are that second quarter allotments may form a base for succeeding quarters. This poses a problem in formulation of production quotas for the year July 1, 1945, to June 30, 1946, which should be placed in manufacturers' hands as soon as possible.

Last year's quotas for the ensuing production year were announced February 3. If production quotas for individual equipment items should be renewed now at present levels for the approaching 1945-1946 production year, they would be meaningless if the materials allotment cut should be confirmed or be made more severe. On the other hand, if the new quotas should be set up on the basis of the reduced second quarter allotments, manufacturers would have a difficult time readjusting their production goals, should future easing of the situation allow upward revision of quotas. Production of repair parts, which are regarded as the last dike staving off collapse of the food program, will not be affected in any event.

The situation is made more serious by the probability that manufacturers

will not be able to complete the full amount of equipment, with the exception of tractors, allowed under quotas for the production year ending June 30. For the first six months of the current production year, wheel tractors were close to scheduled program but the equipment covered by the L-257 Order were 22.9 per cent behind. Since Dec. 31, 1944, when these figures were computed, several factors have changed the situation. Tractors have fallen behind three or four per cent, it is understood.

Tractor production has been affected adversely with one large wheel tractor manufacturer through increased preoccupation with Ordnance contracts, requiring diversion of key personnel, and through an increasingly difficult procurement situation. Another major producer of all types of farm equipment has made minor manpower diversions to war goods. Other manufacturers, over the hump on war contracts, have been able to place increased emphasis on farm equipment. How long it will be before new war contracts are loaded on is problematical, but it is a cinch that the industry, which has carried a heavy Ordnance production burden in the past will not idle long. Currently three of the four largest farm equipment manufacturers hold Chicago Ordnance District contracts totalling \$676,259,404. For the industry as a whole, including Navy contracts and subcontracts, the total probably is close to one billion dollars.

The current favorable overall position on tractors is attributable to the industry's being allowed to compress 60 per cent of its output for the production year into the first six months, during much of which time Ordnance production was tapering. With this head start, some manufacturers have been able to complete as much as 75 per cent of their total quota, with four months left in the production year.

The implement situation is spotty. Combined harvesters—"combines" in



POTENTIAL FOOD SHORTAGE: War Food Administration sources believe further cuts in farm implement output as contemplated by WPB may seriously affect food output later in the year. Here is a Massey-Harris corn picker working a strategic job in view of manpower shortages on farms.

the trade—appear to be in particularly bad shape productionwise. Because combines and other harvesting equipment usually are scheduled for production in the latter part of the production year, manpower and material developments in the next four months will affect greatly the ability to meet quota goals.

Inability to secure delivery of controlled materials and components is pinching with increased severity. Failure of steel producers to meet delivery promises already is affecting implement production. The turbulent steel sheet delivery situation promises to cause particular trouble. One manufacturer reports difficulty in securing necessary alloy steel, pointing out that his supplier has furnace capacity idle for lack of manpower. Availability of gray iron castings long has been a sore spot. Malleable castings, however, still cannot be secured in desired quantity on schedule. This item has been particularly hard hit by revival of the tank-automotive program. One important farm equipment manufacturer is redesigning his line to eliminate many malleable castings.

WLB Orders Fixed Term For Steel Contract

Washington

• • • Complying with a demand of the CIO-USW, the National War Labor Board last week directed that the collective bargaining contract made with five United States Steel Corp. subsidiaries continue for a fixed term ending Oct. 15, 1946, rather than be reopenable on 10 days' notice as in the past and as had been asked by the steel companies.

Industry members dissented from the order. The termination clause was the only phase of the agreement left unsettled and was referred to the board for decision.

Provision is made in the order, however, that if during the life of the agreement, which grew out of the so-called "basic steel" findings of the board, there is any change in the National Wage Stabilization Policy "which permits adjustment in the wage rate structure in effect under this agreement either party may, upon giving written notice to the other party, reopen the matter of wages."

In supporting the board's action, Chairman William H. Davis said that the basic steel decision contemplated a fix-term agreement. Under the circumstances, he pointed out, it was concluded by the majority that the termination date of Oct. 15, 1946,

"would be appropriate and in line with the objective of bringing about a harmonious, well-balanced and stable wage structure under which the parties could operate for a reasonable fixed period without the unsettling effects of attempting to correct individual wage-rate inequities through the grievance procedure."

Brass Rod and Strip Production Increases

Washington

• • • Copper base alloy rod production set a record of 101 million lb. in January, the WPB Brass Mill Industry Advisory Committee was told at a recent meeting. Brass strip production amounted to 306 million lb., an increase of 58 million lb. over last December despite the tight manpower situation. However, WPB officials said, increased requirements will necessitate larger future deliveries. Brass mill products will remain critical throughout the year, they emphasized in urging brass mill customers to place orders early.

Production requirements for 1945 released by government officials indicate that mills must produce 384 million lb. of brass strip per month beginning in September; brass rod production must be increased to 130 million lb. a month, starting in October; and expanded brass foundry facilities will be required.

Settles Significant Silica Sand Wage Case

Chicago

• • • Issues involving wages and working conditions for silica sand producers in the Ottawa, Ill., district, source of much of the nation's steel foundry sand, were settled in a recent order of the Sixth Regional War Labor Board.

The order covers 227 employees of Ottawa Silica Co., Wedron Silica Co., and Standard Silica Corp., and is an outgrowth of negotiations with the Federation of Glass, Ceramic & Silica Sand Workers Local 31 (CIO).

The board ordered maintenance of membership, check-off, time and a half for overtime after 8 hr. daily or 40 hr. weekly or for work on any of six legal holidays. Seniority is to apply in case of layoffs and recall with certain specified exceptions. Accumulating seniority for employees who may be drafted for other work in event of a labor draft was provided for and such seniority is to accumulate at same rate as for employees in military service. A three-cent hourly premium for second shift and five-cent premium for third shift workers was granted.

The board denied union requests for 15c. hourly general increase, for other increases to correct alleged inter-plant inequities, and for certain job classifications. Also denied was union request for recognition as sole bargaining agent, the issue being referred to the National Labor Relations Board for determination.

Contract Awards Pass Billion Dollar Mark

Detroit

• • • Supply and facility contracts in this area awarded since Jan. 1 have now passed the billion dollar mark, the Regional War Production Board has announced.

The total of contracts achieved within the first two months of the year, \$1,075,000,000, is about half the size of the contract total for all of 1944.

Among the larger awards approved late in February was one to the Chevrolet Division of General Motors Corp. for \$112,000,000 in aircraft engines and spare parts. Fisher Body Division of General Motors received a new \$94,000,000 contract for B-29 component parts, of which 30 per cent will be subcontracted.



FRONT LINE SHOP: Welding a gun platform is one of the hundreds of operations performed by the British Royal Electrical Mechanical Engineer workshops, which are kept busy repairing small arms brought in from the battlefields in Germany.

Steel Industry Short 62,000 Workers As Steel Output Suffers

Washington

••• The Steel Industry Advisory Committee recently released one of the most comprehensive surveys of manpower that has ever been made public here. It covers the manpower situation in 30 companies employing 66 per cent of the workers in the industry. Other factors in the report deal with the entire industry.

Most significant conclusions reached by the committee follow:

1. That part of the steel industry represented by these companies must have 30,000 to 40,000 additional men to operate the industry to capacity, varying according to the kind of products required. On this basis there is an estimated manpower shortage of 62,000 for the entire industry.

2. That even to maintain present operation there must be no further separations for draft or otherwise that cannot be replaced by satisfactory new employees.

3. That the industry has about reached the limit of female employment on account of the nature of the work required, but nevertheless will continue to use women wherever possible.

4. That the steel industry must have the highest rating with the War Manpower Commission and the local draft boards as an essential industry if it is to contribute its best to the war effort.

5. That the industry continue to work men all available overtime where their services will contribute to essential production.

6. That to reduce to a minimum idle time of producing units, repair crews must be available to complete repairs most expeditiously.

7. That all concerned make further efforts to reduce absenteeism.

8. That everything possible must be done to influence employees from leaving steel plants without real cause.

The report stated that 36 open hearths capable of producing 1,869,000 ingot tons of steel annually are not operating because of a lack of manpower. The reason the industry

MANPOWER
WANTED: The Steel
Industry Advisory
Committee has said 36
open hearth furnaces
with a yearly capacity
of 1,869,000 tons of
steel are idle because
of manpower shortages.
(Photo courtesy U. S.
Steel Corp.)

did not reach the 94,000,000-ton mark last year and only produced 89,500,000 tons was because of a manpower deficit which resulted in the loss of approximately 4,500,000 tons of production.

A rough appraisal of the position of the industry as of Feb. 15 based on steel units not operating and chief causes therefore follows:

| | | Capacity, Tons |
|-----------------------|-----|-------------------|
| Open hearths off | 154 | 10,255,000 |
| For repairs | 92 | 7,442,000 |
| For labor lack | 36 | 1,969,000 |
| For other reasons* .. | 26 | 944,000 |

*Finishing mill limitations, fuel, raw materials, cutbacks, lack of orders.

At least 1,500,000 tons of blast furnace capacity is idle because of a manpower shortage, the report alleged. With respect to electric furnaces and Bessemer converters the story is the same; more manpower would result in increased output.

The committee noted that even if manpower were available to produce to ingot capacity, there would still be a manpower shortage for rolling of finished products.

The committee said that the limit has been reached in overtime, since so many men are used beyond the 48-hr. schedule wherever possible.

In 1944, the industry lost about 30,000 men to the draft, and 175,000 other workers quit for other reasons. The net result was that there was a net loss of 20,000 men when the new hirings of 185,000 men are figured in.

The number of additional employees needed to maintain war production at the required rate as of Dec. 31, 1944, was estimated as follows:

| | |
|---|--------|
| Coke plant | 633 |
| Blast furnaces | 1,933 |
| Open hearth, Bessemer and electric furnace | 1,425 |
| Rolling mills | 3,794 |
| Maintenance | 2,815 |
| Subtotal | 9,700 |
| All other departments | 12,546 |
| Total | 22,246 |

The estimated number of men by which present manpower shortage will be increased in the near future by the new Selective Service requirements, with tonnage loss, are estimated as follows:

| | | Possible Monthly Tonnage Loss |
|--|--------|--|
| Coke plant | 355 | 63,000 Tons |
| Blast furnace .. | 414 | 70,000 " |
| Open hearth, Bessemer and electric furnace ... | 1,273 | 138,000 " |
| Rolling mills | 1,903 | 150,000 " |
| Maintenance | 1,904 | |
| Subtotal | 5,849 | |
| All other departments | 12,926 | |
| Total | 18,775 | |

From the foregoing tables it can be seen that 41,021 workers of all kinds are needed by 30 companies employing 66 per cent of all the workers in the steel industry in the next year. The report says that 15,459 men are needed by these companies in coke plants, open hearths, Bessemer and electric furnaces, rolling mills and in maintenance. In the March 1 issue of THE IRON AGE it was erroneously stated that the industry's total manpower needs are 25,4772.

The possible annual ingot production drop on account of draft withdrawals is estimated to be 1,656,000 tons, and rolled steel loss is put at 1,800,000 tons.



Light Metals Men Show Fear Of Canadian Competition from Shipshaw

Washington

• • • Sixty-three million pounds of magnesium annually is seen as the annual postwar usage by Dr. Willard H. Dow, president of the Dow Chemical Co. in testimony Monday before the Senate Small Business Committee. Continuing the hearings covering the entire light metals field, war developments and future prospects for new businesses were discussed by the committee.

Previous testimony brought out opinions from President R. S. Reynolds, of Reynolds Metals Co., and Arnold Troy, president of Eastern Metal Products Co., New York, representing the small fabricators, as well as from President Edward S. Christiansen, of the Magnesium Association. Opinions from Dr. William Y. Elliott, vice-chairman of the civilian requirements section of the WPB, and from Hans A. Klagsbrun, executive vice-president of the Defense Plant Corp. were also entered in testimony.

Yet to be heard from as the overall picture is examined for prospects for small entrepreneurs are representatives of the Aluminum Co. of America, representatives of large potential consumers in aviation, automobiles, railroads; power company executives; army-navy representatives, and government executives.

Great interest is being shown by the legislators in the existence of an apparently airtight international aluminum cartel, excluding this country, as well as the postwar future of the Aluminum Co. of Canada, now the largest producer, equipped to cut prices below those of any other firm in the field if it so desires. Using its own power development at Shipshaw, the Canadian firms costs are said to be 40 per cent below those of any other producer. Largely financed by the RFC, this firm's production rate is said to be 1,050,000,000 pounds, the largest plant in the world.

Presence of this potential threat over the American market was emphasized by Walter Rice, vice-president of Reynolds Metal Co., who participated in the now historic anti-trust suit against the Aluminum Co. of America in which Alcoa was acquitted. In this connection, Sen. Kenneth S. Wherry, of Nebraska, one of the most active interrogators on the committee tried hard to persuade Mr. Rice to confirm his inferences that Alcoa had participated in the cartel in the form of a direct statement for the record, which dubious honor he reluctantly declined.

Displaying and describing various new uses for aluminum in combination with steel, plywood, paper, and

plastics, Reynolds asserted that his firm, as long as afforded equality of opportunity by the government would help to furnish the competition in production demanded by the representatives of the fabricators. He predicted that the special properties of aluminum would produce a large field for it, if an economy of plenty, resulting in full development were fostered.

Indications from his testimony were that his firm is interested in expanding its ingot capacity through the acquisition of certain DPC plants, if the conditions of sale or lease are satisfactory. According to his statement, he has yet to make a complete study of such facilities, so that he is unable to predict exactly which plants he will consider.

Reynolds' testimony complained at length against treatment afforded the Aluminum Co. of Canada by the RFC in the matter of loans, with the summation by one of the Senators that according to the testimony it was a case of Jesse Jones of the RFC lined up with Aluminum of Canada against Reynolds who had only the help of the Almighty.

Despite indications from small fabricators that their uses of magnesium would be limited by the necessity of careful handling, Dr. Dow struck an optimistic note, seeing an expansion to as high as 63,000,000 pounds annually within five years after the close of the war. Company estimates, he indicated, were that consumption ought to rise rapidly after the fifty million lb. mark is passed, whereupon the uses developed "will sprout other uses."

He broke down the end products by pounds as follows: aircraft, etc., 28,000,000; textiles 6,000,000; manually handled equipment 5,000,000; oil field industry, 5,000,000; automobile die castings, 5,000,000; buses, trucks, trailers, 2,000,000; printing industry, 1,000,000; other automatic machinery, 1,000,000; die cast consumer goods, 5,000,000. This total of 58,000,000 lb. would be increased by 3,000,000 lb. of aluminum alloy and 2,000,000 lb. of chemical and deoxidizer, or a total of 63,000,000 lb. Dr. Dow did not go into detail as to how these figures were estimated, but he did say they were set up as the company's own internal estimate, rather than a prophecy for general use, and that different means of figuring were utilized.

Production last year, he said, was 316,000,000 lb. compared with 374,600,000 lb. in 1943. Total consumption last year was 316,000,000 pounds against 332,200,000 lb. in 1943; in

ALUMINUM COMPETITION: R. S. Reynolds, president of Reynolds Metals, testified before the Senate Small Business Committee that his aluminum ingot operations thus far have been a financial loss, that fabrication has continued to make up the losses incurred due to competitive losses in ingot sales.



each year structural uses—mostly for airplanes—absorbed about half of the production while the other half went into shells of various kinds purely for munitions purposes.

Dow Chemical Co., he said, is currently spending about \$1,000,000 a year in research to learn more about the properties of magnesium and its performance under various circumstances. "We are creating products which many others will be able to take up and manufacture and market," he said. "Let me emphasize that we are in fabrication primarily as developers."

One such study Dow is making is in the use of magnesium as a cathodic protection of steel in contact with earth or water. The potential market for magnesium as a protective element for oil pipelines, he said, is 60,000,000 lb. a year.

The statement presented by the Dow president outlined a proposal by which facilities for magnesium manufacture provided by the DPC can be disposed of to further the national interest. He pointed out that DPC owns 13 producing units, part of some 91 fabricating units, and has a stockpile or inventory of around 100,000,000 lb. of ingots and alloys.

He guessed that standby plants which should be set aside would have capacity somewhere upwards of 200,000,000 lb. a year, and would be selected for strategic as well as economic reasons. Provision might be made to lease such plants to private industry on proper terms in the event that the demand for magnesium grows to such proportions that private industry wanted them.

He suggested further that the scientific bodies surveying those plants also check the remaining plants and put values on them as for lease or for sale.

Fabricating plants and DPC machinery in privately owned plants could be disposed of in much the same way, he suggested, except that military needs will not be so great and a thorough scientific survey is not necessary.

He urged that the present stockpile be retained out of the market, saying that if it were thrown on sale it would kill all private production for several years and therefore would impair technological progress. He suggested that the Army and Navy estimate a stockpile large enough to give all possible protection during the war, and that production be adjusted so that the stockpile will not go beyond the maximum figure, and that at the close

C. F. & I.'s Hat in Ring

Washington

• • • The Colorado Fuel & Iron Corp., whose plant is located in Pueblo, Colo., has joined the United States Steel Corp., and Henry Kaiser in offering to purchase or lease the government-owned steel plant at Geneva, Utah, when it is no longer needed in the war effort. In making this announcement, the RFC said that the Colorado Fuel & Iron Corp., has been advised that at the proper time, DPC, its subsidiary, will be glad to discuss the matter.

of the war the stockpile be set aside as an insurance against future emergencies.

Arnold Troy, president and general manager of Eastern Metal Products Co. of New Rochelle, New York, employer of 300 workers in both magnesium and aluminum, also laid down a program for the disposal of more than a billion dollars worth of government plants and facilities.

He declared that "the government must take the lead in insuring competition in the aluminum industry all the way from the ownership and development of metals through to the fabrication of end products."

Troy summarized his disposal policy as follows:

(1) The government to make sure that competition in production of metals be developed through disposal of plants of low-cost production to independent producers not now in the

field, on terms which would insure their ability successfully to compete with the giants, Alcoa and Reynolds Metals.

(2) Metals producers should be prohibited from fabricating light metal products. This ignores the fact that Alcoa has long been a fabricator, and that Reynolds prewar was one of the largest fabricators.

Troy's opinion was that the future of aluminum has the greater prospect. However, he indicated that both aluminum and magnesium, having started in a small way, will continue in a large way to replace the ferrous and copper metals. If there is a question as to whether the United States can absorb its wartime scale of production in peacetime, it was his judgment that this volume can be stepped up beyond what is now being totally consumed, and will continue indefinitely on this upward trend.

Troy took up the question of the supply of raw material, saying that unless there were at least a half-dozen basic material producing independent facilities available it would be hazardous for the small fabricator to venture too far out in his business enterprise. He continued:

"At least a half-dozen basic sources of supply should be a 'must' for sound economy in both the aluminum and magnesium fields. No one or two companies should be allowed to control the destinies of thousands of small companies without any financial interest in them. This should be established at the earliest opportunity and methods developed so that it is maintained.

Increased Output Of Cast Iron Soil Pipe Discussed by Group

Washington

• • • The possibility of increasing production of cast iron soil pipe and fittings to meet current and future demands was discussed at a recent meeting of the Cast Iron Soil Pipe and Fittings Industry Advisory Committee and WPB officials.

It was pointed out by the government presiding officer that production of this material has declined from approximately 565,000 tons in 1941 to 165,000 tons in 1944, with the result that inventories of wholesalers and manufacturers have been reduced to "mere odds and ends." The committee was told that soil pipe foundries'

report to the WPB Iron and Steel Division showed a backlog of orders of 95,000 tons of soil pipe and fittings as of Dec. 31, 1944. This backlog was said to be growing at the rate of 10,000 tons a month. At the present rate of production, it was added, it would take foundries about eight months to fill these orders. A spokesman for the Plumbing and Heating Division said that a conservative estimate of overall 1945 requirements would be approximately 225,000 tons.

Because soil pipe is not produced for any specific rated order and the method of distributing it does not reveal that it is going into essential end uses, thus making manpower recruitment difficult, the committee recommended that soil pipe and fittings be placed on the critical products list used by USES, in making employment referrals.

Copper, Aluminum And Steel Reported Tight For Second Quarter

Washington

••• In an announcement on March 1, WPB said that production difficulties, manpower shortages and increasing military demands for copper, steel and aluminum resulted in a tighter controlled materials situation for the second quarter than at any time during the last several quarters and that in consequence some war procurement agency production programs may have to be modified.

It was pointed out that drastic reductions in steel were made in less-essential non-military and export allotments and that steps are being taken for temporary curtailment of steel flows for maintenance, repair and operating supplies. Despite these measures, it was stated, it will be impossible to meet the full screened steel requirements of the military services without substantial increases in production, which WPB is trying to effect.

Copper and aluminum requirements for the military also were declared to be rising. They can be met, WPB said, only if additional manpower is found for the nonferrous metals industries. Of all the controlled materials, the carbon steel supply was said to be the most out of balance with demands of claimant agencies. Copper, WPB said, has continued to be tight, and for the first time in several quarters, alloy steel and aluminum have presented difficult problems. Carbon steel allotments to all claimants for the second quarter totaled 14,822,961 tons as compared with 15,862,377 tons allotted for the first quarter. Total second quarter alloy steel allotments were 2,104,603 tons, as compared with 2,122,185 tons for the first quarter.

Indicating that PR-25 has been pushed further in the background, WPB said that it is impossible to make any quantities of carbon steel, alloy steel or copper available for deferred allotments under the spot authorization procedure at the present time.

Giving further emphasis to the cutting down on spot authorizations, WPB announced a 90-day extension of the rules limiting such authorizations in critical labor areas. Formerly this limitation was to expire on March 1, in Group 1 and 2 labor areas except with the unanimous approval

| Controlled Materials | Second Quarter 1945 Allotments in Pounds | First Quarter 1945 Allotments in Pounds |
|-------------------------------------|---|--|
| Copper sheet and strip | 1,032,850,000 | 758,385,000 |
| Copper rod, bar and wire | 835,358,000 | 307,487,000 |
| Copper tube and pipe | 102,800,000 | 95,163,000 |
| Unalloyed brass mill products | 121,797,000 | 122,299,000 |
| Copper wire mill products | 241,861,000 | 239,874,000 |
| Foundry products | 310,818,000 | 334,950,000 |
| Unclassified copper products | 29,500,000 | 46,000,000 |
| Aluminum | 810,556,000 | 690,584,000 |

of the local Production Urgency Committee.

Increased demands on the part of claimant agencies for copper, WPB said, have placed an additional strain upon the supply of copper metal, much of which is imported, to such an extent that it was considered unwise to make available any prime copper products for production authorized under spot procedure.

In the case of aluminum, the total demand from all claimant agencies was said to have increased substantially over that of the first quarter, with the result that it has been very difficult to step up production of certain aluminum products, notably forgings, extrusions, tubing and sheets, to a rate sufficient to meet the accelerated demand. It has been possible, however, it was explained, to make 25,000,000 lb. of aluminum available for deferred allotments under the spot procedure during the second quarter.

In referring to second quarter steel allotments, WPB said that the production of rails and oil country goods will be reduced in order to open up space on limited facilities for the pro-

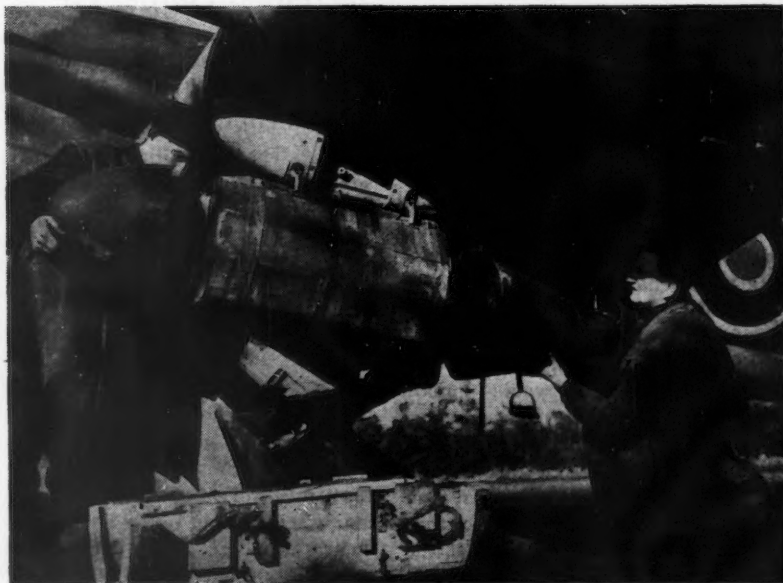
duction of shell steel to meet the rapidly rising critical heavy ammunition program.

In passing out these reduced quantities of steel for non-military production to various manufacturers, WPB said that it will endeavor so far as possible to make the cuts in areas where present total production is overtaxing available facilities, transportation, fuel supplies and manpower required for urgent production in that area.

In analyzing the current steel supply situation, WPB officials pointed out that since the third quarter of 1943, which was the first period during which CMP was operative, quarterly supplies of carbon steel have dropped more than 1,000,000 tons. At the same time, it was said, military and other requirements for the metal have maintained a relatively high level.

Other total controlled materials allotments for the second quarter, as compared with original allotments of the same materials made for the first quarter in the above table.

NEW TYPE BOMB LOAD: Typhoon fighter bombers of RAF 2nd Tactical Air Force are carrying in a new type of bomb load, clusters of high explosive anti-personnel bombs. These explode without causing craters which would impede the progress of ground troops.



War Demand in Canada Causes Step Up in Steel Output to 90 Per Cent

Toronto

• • • As a result of increased shortage of steel in Canada due to accelerated war materials production, output of both steel and pig iron have been stepped up in this country. According to figures released by the Dominion Bureau of Statistics, steel production for January attained a rate of 88.99 per cent of capacity against 80.6 per cent for December, while pig iron output rose to 67.5 per cent from 60.4 per cent in the month immediately preceding. The step-up in production was achieved in spite of labor shortage and adverse winter conditions which created many problems in the handling and transportation of raw materials.

For January, pig iron production amounted to 155,969 net tons compared with 139,152 tons in December and 132,128 tons in January, 1944. For the month under review output included 127,398 tons of basic iron of which 122,002 tons were for producing companies' further use and 5,396 tons for sale; 13,594 tons of foundry iron, all for sale, and 14,977 tons of malleable iron, all for sale.

Ferroalloys produced in January amounted to 12,130 net tons compared with 12,391 tons in December and 16,495 tons in January a year ago. For the month under review production included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrome-x and ferrophosphorus.

Production of steel ingots and castings in January totalled 268,722 net tons against 243,482 tons in December and 242,186 tons in January last year. Output for the month included 253,674 tons of ingots and 15,048 tons of castings.

According to a report from Ottawa, Canada's supply of steel from the United States will be sharply reduced during the three months ending with June. While the proposed cut is expected to be of a temporary nature, due to increased demand for steel across the line, it will mean that some Canadian steel users that have been drawing supplies from the States may be unable to obtain their expected quotas and will have to draw on inventories for the present and possibly reduce manufacturing schedules.

WMC Cracks Down On Regulation Violators

Cleveland

• • • While the critical shortage of male workers in 116 top priority war plants has been reduced 20 per cent in the last two weeks, these same plants still need more than 6700 workers, according to E. L. Keenan, War Manpower Commission director for the Ohio-Michigan-Kentucky region.

This reduction in the number of workers needed was brought about largely by a general tightening of referral procedure and by the voluntary transfer of workers from less essential to urgent war jobs.

At the same time, WMC inspectors have uncovered 1651 hires of male workers in violation of WMC regulations in this three-state region, during the last two weeks, and these have been removed from the companies' payrolls. Many returned to their last employer or were referred to higher priority jobs and a number of immigrant workers were released and advised to return to their home areas because they had left essential

jobs there without statements of availability.

In Youngstown, with 30 top urgency plants, the male labor shortage has increased tremendously as a result of putting the local steel mills on critical labor lists, and while the exact shortage in these plants will not be known until meetings are held between employers and WMC officials, it has been estimated at about 1500.

Some steel plants have already been working their employees far beyond the 48-hr. work week which WMC previously had set for steel, and by putting the industry on the War Production Board's critical list, it will now be permissible for these plants to recruit workers in other labor areas where a surplus might exist.

Elsewhere, an acute labor shortage at the huge Ravenna Ordnance plant was being eased by 50 enlisted men of the U. S. Army, who were furloughed there for construction work. The soldiers, many of whom are overseas veterans, are on 90-day furloughs from Fort Ord, California.

Sole discordant note in the entire



THE MARIANNAS' PITTSBURGH:

Just a few hundred miles from Japan, deep in the heart of the jungles of the Marianas, lies a forward area asphalt-mix plant, established and operated by Aviation Engineers in order to build another American air base.

labor picture at the moment was the news that 150 welders have been laid off temporarily by the Truscon Steel Co., one of Youngstown's top priority plants, because of a shortage of materials. Company officials said there have been no cutbacks in their war orders and pressure for their products is "as great as ever." Output will be boosted again as soon as materials come in and workers laid off will be re-employed.

This shortage of materials has been caused by another shortage, natural gas, which hit Truscon's suppliers.

Will Discuss PPC Problems

Chicago

• • • Problems and developments in the disposal of surplus war plants will be discussed by Hans A. Klagsbrunn, deputy director of surplus war property, RFC, and executive vice-president, DPC, before the war problems school of Chicago Association of Commerce, June 9. The talk will be given at a luncheon meeting at 12.15 p.m., in the Red Lacquer room of the Palmer House, here.

Urges Management To Study Rules Covering Deferment of Workers

Washington

••• New rules laid down by Selective Service pursuant to a program worked out by an interdepartmental manpower committee should be studied closely and strictly followed by the management of critical and essential industries if they wish to secure deferment of indispensable and irreplaceable workers in the 18-29 age group, Dr. Gustave Peck, chairman of the WPB Committee on Certification of Deferment Requests, said on Feb. 28.

Following of the new rules should be as speedy as possible if companies wish to retain their "vital hard core of workers under 30 who are engaged in war production and war supporting activities," Dr. Peck added.

WPB and 14 other agencies have been given the task of certifying men 18-29 classified 2A and 2B on Jan. 1. While the certification is advisory, Dr. Peck says, that employers should not expect requests for deferment to be honored by local boards unless certified by an authorized certifying agency.

No individual plant or establishment may submit applications for deferment to more than one certifying agency. Normally the agency which handled the certification for deferment for the 18-25 age group, or the agency which sponsors the claims of the plant or establishment before the local Production Urgency Committee,

or Manpower Priority Committee, will be the certifying agency for that plant or establishment.

As a basis for determining which registrants below 30 may be certified for occupational deferment, each qualified employer will need to submit the following information to the local WPB or other agency field office.

1. A list, in triplicate, of all men currently in his employ who were on Jan. 1 in the age group 18-29, and who were then on that date classified as 2A or 2B. (The list should not include those classified as 2A (L), 2A (F), 2B (L), 2B (F), or any other draft classification other than 2A or 2B.)

The list must be arranged in the order of each man's importance to the effective operation of the plant or establishment—the most essential irreplaceable man's name appearing first, and must include:

a. Each registrant's name, age, occupation, Selective Service order number, local board, and present Selective Service classification.

b. The following statement: "It is certified that all men listed above are now in my employ; that they were classified 2A or 2B on Jan. 1, 1945, and were on that date in the age group 18 through 29; that such list has been submitted to no other 'Certifying Agency'."

2. Two sets of Form 2A (Special-Revised) for each man for whom the employer feels he must obtain deferment.

Each WPB district manager will act as "authorized Certifying Officer." The district manager will closely su-

pervise the program and do everything possible to insure that each registrant for whom a Form 42A (Special-Revised) is certified meets established standards, and that certifications for each plant or establishment are kept at a minimum. The district manager, Dr. Peck said, may certify Form 42A (Special-Revised) in accordance with the following criteria:

1. No man can be certified for deferment unless he is doing work that is indispensable in an activity that is included within the WMC List of Essential Activities.

2. No such indispensable man can be certified for deferment if he can be replaced by a worker doing less essential work within the plant or establishment, or by recruitment from without.

3. Any indispensable man shall be considered as replaceable if a recruit or transferee is available and can be qualified to perform his work by three months of intensive training.

4. Men engaged in planning, research, development, or production for postwar purposes, shall not be certified for deferment.

Wallace Names Group To Study Potential Postwar Employment

Washington

••• Henry A. Wallace recently sworn in as Secretary of Commerce, has named the first committee which was appointed to make suggestions for enabling small business "to do its full share in furnishing maximum employment postwar." He said it is hoped the committee will give especial attention to the problem of making available to small business adequate supplies of equity financing as well as long term loans at reasonable rates.

Members of the committee are:

Edward E. Brown, president of the First National Bank, Chicago; Prentiss M. Brown, board chairman, Detroit Edison Co.; Eric A. Johnston, president, United States Chamber of Commerce; Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt.; John W. Snyder, vice-president, First National Bank of St. Louis, Mo.; Ernest G. Draper, from the Federal Reserve System's board of governors, and Stacy May, McGraw-Hill Publishing Co., New York.

TEN-CENTS-A-TON LEWIS: *Not to be outdone by other labor leaders and always good for a new wrinkle in wage discussions, John L. Lewis, United Mineworkers' head, now has his sights trained on a goal of 10c. a ton levy on all soft coal mined. Such a levy, if ever obtained, would go into the UMW coffers for modern employee benefits. As usual the bi-yearly conferences, which have in the past officially ended with a strike are now in progress. Mr. Lewis shown here with John O'Leary, left, and Thomas Kennedy, right, both officers of UMW, will probably keep after the 10c. a ton demand with the same tenacity which Philip Murray exhibits on his demand for a guaranteed annual wage.*



Batcheller Reports Production of Field Wire Sets New Record

Washington

• • • Field wire production, along with that of dry cell batteries and cotton duck, is setting a new record, Hiland G. Batcheller, chief of WPB Operations, reported at a meeting last week of the Production Executive Committee. Excellent progress was reported in all three programs, though it was added that their output is not all that the armed services would like.

"We shall produce 155,000 miles of field wire (W-110B) this month," said the report, "and the new equipment needed to reach the scheduled peak production of 200,000 miles a month is being delivered as expected. About 10 per cent of that peak will be substitute wire, with plastic instead of braid covering, but the 180,000 mile remainder will be slightly above the 179,000 miles monthly issue requirement (excluding what is needed to make up deficiencies in stocks)."

Mr. Batcheller stated that extraordinary progress has been made in alleviating the critical situation in the aluminum sheet program. Production has been rising sharply and it is now estimated that the output of sheet, strip, plate and foil in the first quarter will be close to 270,000,000 lb., an increase of 50,000,000 lb. over estimates made a few weeks ago. However, he pointed out, stated requirements for the second quarter are about 330,000,000 lb.

Containers were listed by Mr. Batcheller as constituting a new critical program.

"We are," he said, "apparently not going to have enough containerboard, cotton bagging, steel pails, steel strapping, crates and shooks and boxes, or other types of containers to package all of our authorized production, and we are going to have to make a decision as to who takes the necessary cuts. The container program is partly the result of manpower and partly the result of shortages of materials, which will become still more acute in the second quarter."

Giving a statistical picture of the second quarter container outlook, Mr. Batcheller said steel requirements for steel drums and pails are 190,000 tons, but only 143,300 tons will be available, while in the fourth quarter 189,342 tons will be available. Steel strapping requirements for the second quarter are 95,000 tons and will almost be met

since 90,000 tons will be available. There will be 83,761 tons available for the fourth quarter.

Meanwhile conservation plans to insure sufficient components for the Army's huge 1945 requirements for field wire were highlighted at a recent meeting of the WPB Copper Wire and

Cable Mill Industry Committee. Industry members said that they believed their mills could produce sufficient wire to meet all armed services needs, including the Army's requirements for field and communication wire, if they were assured adequate materials.

Cold Driven Rivets Now in Use

Pittsburgh

• • • Cold driven riveting is being used in the fabrication of a heavy craneway of a blooming mill in one of Pittsburgh's steel plants by the Fort Pitt Bridgeworks, Pittsburgh. This is the first heavy structure to be fabricated by the cold rivet process and the job is arousing interest in steel and construction industries.

The cold rivet is driven under sufficient pressure to enlarge the shank to completely fill the hole before the head is formed. This results in a greater stress carrying value and improved workmanship over hot driven rivets, it is claimed. Cold driving with controlled safe pressures as determined for rivet size and material, has been shown to cause the rivet to completely fill the hole, thus giving a tight joint and, at the same time, increasing rivet strength.

A demonstration of cold driving of rivets on structural steel was recently given at the Fort Pitt bridge works plant at Canonsburg, Pa. Fort Pitt officials feel that the fabrication of structural steel by cold riveting may be widely adopted by large users of such material.

Foote-Burt Shareholders Meet

• • • At the annual meeting of the shareholders of the Foote-Burt Co., Cleveland, held at the company's office, the board of directors was re-elected and at the board meeting immediately following, George Seabrook was elected secretary-treasurer succeeding S. E. Gross, who retired after 27 years of service.

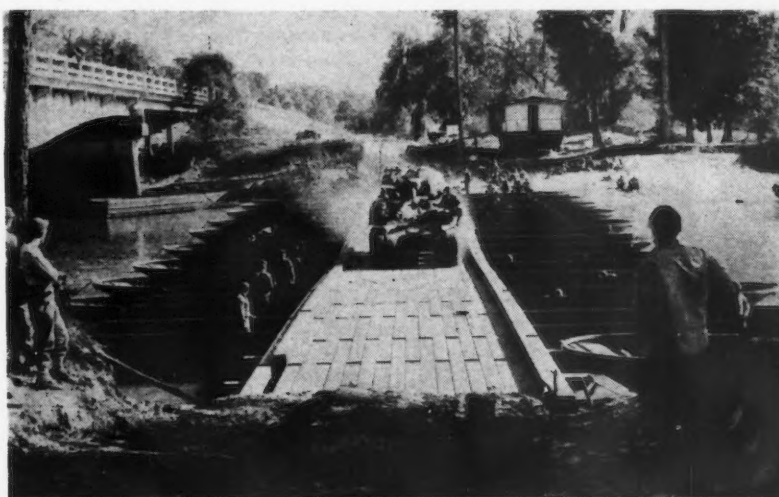
A dividend of 15c. per share was declared payable March 15, 1945, to shareholders of record as of March 5, 1945.

Westinghouse Keeps Arsenals

Detroit

• • • Operations at naval arsenals at Detroit, Louisville and Canton will remain under management of Westinghouse Electric & Mfg. Co., rather than transfer to direct Navy supervision on July 1 as previously planned. The change in plans of the Navy appeared to have been the result of representation by labor, led by the CIO United Automobile Workers union, claiming that lower pay scales and other working conditions under civil service would impair morale and reduce production at the plants.

ALUMINUM BRIDGE: Built entirely of aluminum, this floating bridge has been designed especially for fast erection in swift currents. The Engineer's Corps declines to comment as to whether they have been used in combat areas.



Steel Advisory Group Discusses Changes In Shipping Drum Order

Washington

• • • Proposed changes in the War Production Board's steel shipping drum Order L-197 were discussed by members of the Steel Shipping Containers Industry Advisory Committee at a recent meeting here, WPB reported. It is desired to keep the order flexible and permit industry to produce as many drums as possible to fill essential needs, officials explained. The most critical needs were said to be in the small drum and pail field, and indications were that the future demands of the Army, Navy and Air Forces would increase materially, especially for small sizes.

A representative of the WPB Steel Division reported that the steel situation is becoming more acute, that there was no room on steel mill schedules for any more orders for the second quarter, and that third quarter schedules are rapidly filling up. There are no possibilities for increased allocations of steel in the near future except for the Army and Navy orders, he said.

Industry members reported that the volume of rated military orders is increasing and that consequently their rated backlogs are building up.

Inventories of steel were reported decreasing and deliveries falling behind schedule because of gas and manpower shortages, transportation difficulties and weather conditions.

WMC Upheld on Labor Case at New Bedford

New Bedford, Mass.

• • • In its first test of the right to draft labor into critical labor-short industries, the War Manpower Commission found judicial support in an action brought by the Congress of Industrial Organizations to enjoin allegedly unconstitutional transfers of labor by directive on March 5.

Federal District Judge Charles E. Wyzanski, Jr., denied in Boston the CIO petition for an injunction to prevent the transfer of 89 workers from New Bedford fine cotton goods mills to local Fisk and Firestone plants producing tire cording on the basis that the court was without jurisdiction because constitutional rights were not involved. Agents of the CIO and the American Federation of Labor say that such forced labor transfers are a violation of constitutional rights, and there is said to be the possibilities of strikes which would close all the plants involved.

Lend-Lease Houses Put Tight Squeeze On Bathtub Output

Washington

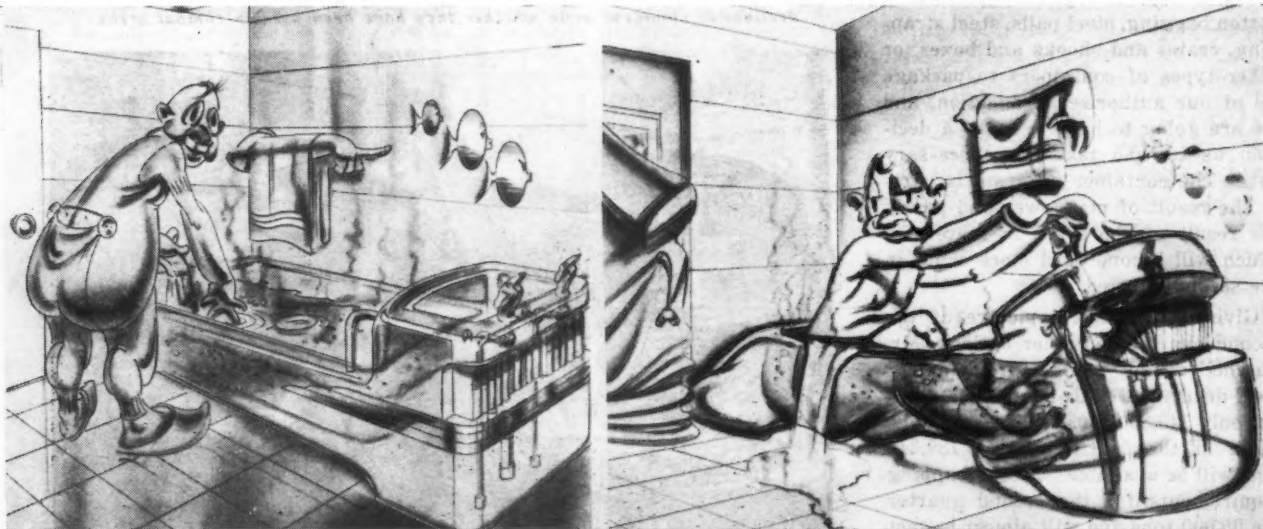
• • • The production of 30,000 prefabricated temporary emergency lumber houses for England placed an additional burden on foundries making cast iron bathtubs, the production of which for the second quarter, WPB has announced, cannot be programmed until manpower clearance has been obtained from Area Production Urgency Committees and WMC.

Clearance of manpower requirements for plants producing bathtubs is under consideration and early decisions are expected.

At a recent meeting the Sanitary Cast Iron and Formed Enamelware Industry Advisory Committee was told that because of present manpower shortages second quarter authorizations may be decreased below 50,000 bathtubs which has been authorized each quarter for the past five quarters.

At present only 7500 cast iron bathtubs have been authorized for the emergency houses for England. These houses will be built in this country at a cost estimated at \$50,000,000 under lend-lease.

THE POSTWAR BAWTH: The industrial designing firm of Sundberg-Ferar, Detroit, dreamed up some ideas on over-doing postwar plastics in a series of cartoons. At left is Mr. Average Citizen of the "plastic era" drawing a bath in the first "flexiparent bathtub" of his all-plastic bathroom. The latter part of the bathtub's name comes from its transparency; the forepart from its ability to formfit, as shown in the cartoon at right. Sundberg-Ferar had some other interesting ideas to satirize the wonderful age of tomorrow—for instance the pointer towel rack shown at left, indicating the direction to an unmentionable corner whose coziness is suggested by the bookshelf facing it, and also the idea of filling the basin on the right of the tub with hot water, then pouring it—as at right—into the filled tub to bring the temperature to the desired level. Wonderful world!



Call Is Issued for Prompt Cancellation of Invalid Steel Orders

Washington

• • • Calling for actual cancellation of purchase orders placed on mills in the first three months of the year for the second quarter because firm allotments and readjusted programs make it necessary to insure proper CMP operation, WPB on March 5 said that orders that are no longer valid should be removed from mill schedules.

WPB officials stressed the fact that orders for large quantities of steel, chiefly sheet and strip—are not awaiting placement, but that no action can be taken until mill schedules are cleared to make room for them.

WPB field offices have been instructed to contact at once consumers whose programs have been cut and to work with them to assure that invalidated steel orders are cancelled and that any unused allotments of steel are returned promptly in accordance with controlled Materials Plans Regulations.

The order cancellation which will be principally in carbon steel will be felt by "B" products manufacturers who will feel a 12 per cent cut; a 50 per cent cut will be put into effect with respect to orders of the farm machinery manufacturers on new production and, of course, container manufacturers took a stiff slash of about 20 per cent in the second quarter.

The cutbacks were necessitated by the 3,000,000 ton carry-over, and the over allotment of 114.6 per cent of

carbon steel in the first quarter and the subsequent advance allotment of 90 per cent of this supply with the assumption that programs would continue as set in the first quarter. Increased military allotment of 500,000 tons over first quarter and consequent reduction in allotments for FEA, ODT, the Office of the Operations Chairman, caused program revisions for these claimants and others whose allotments were trimmed to make way for the military increase.

At the same time, WPB said that directives would only be used in cases of emergency and not to remedy emergencies which are not immediate, or to anchor advance orders in mill schedules. This will be limited to the placing of directives generally 15 days ahead of lead time, or probably about 45 days.

All agencies concerned agree that the use of directives to bring about production adjustment is unsound, although in some instances in the last two months, it is recognized that the device is necessary.

Joint instructions to field offices of both the military services and WPB are being issued to regulate the issuance of special directives.

Under this plan, if it is contemplated that a directive be issued, the following information must be obtained from the mill involved: 1. Inventory position; 2. orders on schedule; 3. material in transit; and 4. pro-

posed change-over date, taking into consideration production losses if delivery is not completed. These facts must be certified, and on the basis of this information a determination will be made as to the issuance of a production directive.

Scout Proposed Scrap Drive

Chicago

• • • Proposals that the WPB undertake another salvage drive find opinions of buyers and sellers of scrap in this district ranging from skepticism to outright scorn. Other districts may require scrap but the local situation apparently is as follows: With universally comfortable inventories, mills are refusing at less than ceiling prices substantial offerings of scrap of better grade than most of that turned up by the last WPB drive. Even if the drive were confined to farm and industrial sources, most of the material secured in excess of that now flowing to market would fail to bring ceiling prices, the tenor of the local market indicates. With the worst winter weather past, the normal seasonal flow of scrap, which always has been ample to fill all needs, should increase.

Yard dealers frankly look askance at the idea of having to handle any more material, particularly unsegregated scrap of doubtful origin. Labor is inadequate to process material already on hand. Furthermore the trade is not inclined to tie up its notably limited working capital in even the best quality scrap, let alone making a blind purchase.

*** PIG IRON OUTPUT DROPS:** Production of pig iron, ferromanganese and spiegel declined to 4,945,018 tons in January from 4,998,757 tons in December, according to American Iron & Steel Institute. Adverse weather conditions, affecting railroad shipments, were a factor helping to account for the decline. In January 1944, production was 5,275,852 tons.

Blast Furnace Capacity and Production—Net Tons

Source: American Iron & Steel Institute

| | Number of Companies | Annual Blast Furnace Capacity | PRODUCTION | | | | | | | |
|-----------------------------|---------------------|-------------------------------|------------|--------------|-----------------------------|--------------|-----------|--------------|----------------------|--------------|
| | | | PIG IRON | | FERRO-MANGANESE AND SPIEGEL | | TOTAL | | | |
| | | | January | Year to Date | Current Month | Year to Date | January | Year to Date | Per Cent of Capacity | |
| | | | | | | | | | Current Month | Year to Date |
| DISTRIBUTION BY DISTRICTS: | | | | | | | | | | |
| Eastern | 12 | 12,988,970 | 831,349 | | 24,814 | | 856,163 | | 77.6 | |
| Pittsburgh-Youngstown | 15 | 25,904,240 | 1,980,251 | | 19,257 | | 1,999,508 | | 90.8 | |
| Cleveland-Detroit | 7 | 6,589,500 | 476,176 | | | | 476,176 | | 85.1 | |
| Chicago | 7 | 14,070,510 | 1,078,944 | | | | 1,078,944 | | 90.3 | |
| Southern | 8 | 4,924,670 | 348,669 | | 13,335 | | 362,004 | | 86.5 | |
| Western | 4 | 2,836,000 | 172,223 | | | | 172,223 | | 71.5 | |
| TOTAL | 37 | 67,313,890 | 4,887,612 | | 57,406 | | 4,945,018 | | 86.5 | |

Industrial Briefs . . .

• **TO BUILD LABORATORY** — A new research laboratory will be constructed in Brecksville, Ohio, by the B. F. Goodrich Co., John L. Collyer, president, announced recently. Architects have completed principal plans and designs and construction work will be started as soon as possible on this laboratory which will be built on a tract of land on the Cleveland-Akron highway, about 20 miles from the company's operations in Akron.

• **PRODUCTION RECORD**—The Mt. Vernon Car Mfg. Co., a division of H. K. Porter Co., Inc., set a production record for the month of February by turning out 668 freight cars.

• **REPRESENTATIVE** — Moltrup Steel Products Co., Beaver Falls, Pa., has appointed Howard H. Heinz, Inc., Detroit, as their sales representative for the State of Michigan.

• **BUYS TWO CONCERNS**—American Engineering Co. concluded recently negotiations for the acquisition of the entire outstanding stock of Cochrane Corp., Philadelphia, and Faraday Electric Corp., Adrian, Mich., in a move to broaden the activities of the company.

• **ENLARGES FACILITIES**—Tractor & Equipment Co., Chicago, has expanded its facilities by taking a 10-year lease on a 200 x 60 ft. building.

• **JOINS NTDMA**—A group of leading drop forging die manufacturers voted at a meeting in Detroit recently to affiliate themselves with the National Tool and Die Manufacturers Association. A number of these shops have been in the association for some time, but the majority was as yet unaffiliated.

• **ABRASIVE FILM** — A. P. de Sanno & Son, Inc., Phoenixville, Pa., recently made available a film describing the abrasive cut-off method. The 16 mm. sound film, entitled "Speed in Cutting," is narrated by Lowell

Thomas. It shows the effectiveness and cutting-off time of many metals.

• **ACQUIRES STOCK**—The Evergreen Mines Co., Crosby, Minn., independent producers of iron and manganiferous ores, have announced that a substantial stock interest in that company has been acquired by the M. A. Hanna Co. and an arrangement entered into whereby the Hanna Co. will undertake the operating management of its iron ore properties. Perry G. Harrison will continue as president of the Evergreen Co.

• **TRADE INQUIRIES RISE**—Firms in 43 foreign countries have placed 139 inquiries for trade contacts in the past month with the foreign commerce department of the Chicago Association of Commerce. Nearly every type of merchandise is listed in the recently issued foreign business opportunities bulletin, including building materials, transportation and communications equipment, and machinery. Argentina and Egypt lead in the number of inquiries, with 12 from each country. Mexico is third with 11.

• **SELECT OWN UNION** — The Employees Independent Union at the Kearney & Trecker Corp., Milwaukee, will continue to bargain collectively for production and maintenance employees, it was determined at an election held under national labor board scrutiny.

• **HEADS VALVE GROUP**—W. B. Holton, Jr., president of the Walworth Co., was elected president of the Valve Manufacturers Association, a national organization, at a meeting held in New York recently.

• **WORKERS' SUGGESTIONS**—Production suggestions from employees netted General Electric workers \$232,735 in awards during 1944. The total payment was for 19,488 ideas adopted by the suggestion committee.

U. S. Navy Expend Over \$200,000,000 To Rebuild French Fleet

Washington

• • • The United States Navy has spent more than \$200,000,000 to rebuild the French Navy since the Allied landings in North Africa in 1942, the Office of War Information reported recently, on the basis of data supplied by the Navy Department. In addition, the United States is continuing to supply all material to operate the French Fleet, with some assistance from the British, the Navy said.

American Navy yards have repaired, refitted and modernized more than a score of French naval vessels. Repairing these ships cost \$37,777,782.52. This total does not include the cost of new material that went into these ships or was sent abroad for installation on other French Navy ships. Ordnance materials for these vessels cost \$10,666,993.50. Ammunition alone cost approximately \$500,000.

The United States Navy has transferred 155 naval and auxiliary craft to the French Navy. The vessels transferred included: 50 submarine chasers; 34 patrol craft; 31 minesweepers; 24 tugs; six destroyer escorts; four water barges; three net layers; three gasoline tankers. The combatant ships transferred prior to this year cost the United States \$125,960,889.49, and the auxiliary craft \$2,471,358.20.

The United States has also transferred four squadrons of planes to French naval aviation, given the French Navy \$6,164,298.55 worth of clothing, and during 1945 will train in this country approximately 300 French naval flyers.

Up to Jan. 1, 1945, through lend-lease and defense aid, the French Navy had received \$190,233,681.28 in materials and work from the United States.

The Jan. 1 lend-lease and defense aid total figure does not include the total cost of training French naval flyers.

The U. S. Navy continues to provide spare parts, repair materials, gun replacements and ammunition for French Navy ships. Whenever possible, ships transferred to the French Navy have been given new equipment that was developed for installation on American vessels of the same classes.

Set-Up Man Shortage Perils Production Of Needed Ammunition

Washington

• • • Production of artillery, mortar ammunition and bombs is endangered because of a serious shortage of set-up men in the automatic screw machine products industry, according to WPB. The industry was said to be producing at only 60 per cent of capacity at a time when programs requiring its products have been doubled. Several hundred men, WPB officials stated, are needed to fill these essential jobs. Examples of products made by the industry are aircraft carburetor needles, Norden bomb-sights and the firing pins that detonate all shells and bombs.

Set-up men occupy key positions, it was pointed out, and are highly skilled workers who can lay out tool sequences for intricate work, select speeds, feeds, tools and cams to be used and who can instruct others as well as supervise and make repairs and adjustments to machines. When one set-up man is lacking, WPB said, an average of 17 other workers of lesser skills are unable to perform their functions. The shortage of set-up men, it was explained, is aggravated by the three-to-four-year training periods required to fit them for their jobs and the fact that a large percentage of already trained set-up men are of draft age.

The increased ammunition programs for 1945 mean an increase of 150 per cent over the rate of production in January, 1944, and a 65 per cent increase over the present rate of production. This increase calls for even greater increases in the production of the automatic screw machine industry, since each shell, fuse and booster involves a multiplicity of parts and processes.

For one particular fuse program, for example, the approximate 1945 increase over 1944 is 11,000,000 fuses a month. Since there are 20 screw machine products used in this particular fuse, an increase of 220,000,000 parts a month is actually required.

Lead Products Now Controlled

Washington

• • • Collapsible tubes, lead-acid storage batteries and foil manufactured of lead have been placed under import control by WPB by amendment of General Imports Order M-63, governing imports of strategic materials.

Foreign Briefs . . .

• **LATIN AMERICA**—Borg-Warner International Corp. is establishing offices and headquarters for Latin American trade at Sao Paulo, Brazil, under the direction of L. W. Turner. In addition a warehouse has been established at Auburn, Ind., to consolidate shipments to South America from the various Borg-Warner associates.

• **FRANCE**—The lack of locomotives and freight cars constitutes one of the greatest French problems. In September France was left with 22 per cent of the number of locomotives the country had before the war, with 37 per cent of the number of freight cars, and 21 per cent of the number of passenger cars.

By vigorous repair efforts the number of available locomotives was increased from 2600 to 6000, but only 160,000 freight cars as compared to 430,000 before the war are available. France has orders on American company books for 700 locomotives, but delivery may take some time.

• **SWEDEN**—Efforts made by the Swedish Government proved unsuccessful in preventing 125,000 metal and foundry workers from going on strike recently for higher wages. This was the worst strike in Sweden in more than 20 years, and was a serious blow to the country's wartime economy.

• **SOUTH AFRICA**—According to Dr. H. J. van der Bijl, chairman of the South African Iron & Steel Industrial Corporation, Ltd., the annual steel production of Iscor during the last four years had been: Year ended June 30, 1941, 316,991 tons; 1941-1942, 326,154 tons; 1942-1943, 377,300 tons; 1943-1944, 466,216 tons.

The production of special steels displaced a much greater tonnage of commercial steels during the war period with the result that total output at Iscor was reduced to that extent. Throughout the war period, construction work had been in

progress in connection with plant extensions.

According to Dr. van der Bijl, consumption of steel in South Africa has been much in excess of local production. Although a large per cent of this consumption is for war purposes, it was his belief that there was a considerable backlog of unsatisfied demand which would have to be met when restrictions are removed.

The company plans further extensions in the postwar period and also expects to expand the output of steel products, such increases to take place mainly at its new steel works site at Vanderbijl Park.

• **NEW STRIP MILL**—Richard Thomas & Baldwins, Ltd., Guest Keen Baldwins Iron & Steel Co., Ltd., Briton Ferry Steel Co., Ltd., and Llanelly Steel Co., Ltd., are jointly concerned in a project to build another strip mill in South Wales. The unit will be a hot strip mill for tin plate and sheets to be located at Port Talbot. Certain technical, financial and administrative problems are still to be solved on the project and the question of cold reduction mills is receiving active consideration.

• **AUSTRALIA**—The Broken Hill Pty. Co., Ltd., is reported by the *British Iron and Steel* to be using a new process for the production of high grade armor steel which eliminates the use of vanadium, a material unobtainable in Australia. In its place, zirconium obtained from zircon stands north of New Castle is used.

• **CANADA**—Simson - Maxwell, Ltd., Vancouver, British Columbia, has been appointed representative of the Cooper-Bessemer Corp., Mount Vernon, Ohio, U. S. A., in that province. The distributor, active in the marine, mining and lumber industries, will handle all Cooper-Bessemer vertical diesels, as well as other types made by the company.

Surplus Group Handling Machines, Steels, and Aircraft

... By DONALD BROWNE ...

New York

• • • An adventure in business that seems to confound preconceived ideas of what government-in-business is bound to be is the RFC Surplus War Property Disposal Division at 70 Pike Street, New York. The office is charged with selling machine tools, industrial equipment, metals, chemicals and aircraft declared surplus in New York and New Jersey.

A lack of red-tape and bureaucracy was noticeable and it is apparent that the office has gotten off to a good beginning. Established commercial practices are being followed by a sales group and administrators in an organization of about 200 employees.

The first step in agency business is getting proper descriptions of property declared surplus. A metal product must be described with respect to chemistry, length, shape, width, finish and extra, and its condition, whether prime, good or fair. Other items must

be described in accordance with commercial practice. When agencies do not properly describe materials or products RFC requests that such descriptions be furnished.

More and more inspection work is being done because the agency has for some products at least abandoned its original policy of "as is." Now, RFC warrants the accuracy of the description of the property listed, but does not warrant its suitability for any particular use. If RFC says property is new or improperly describes property, the buyer can make a claim within 15 days because of the variation. RFC limits its liability to the sales prices of the material.

When declarations are received, quality and quantity and other descriptive information is coded and recorded on IBM cards to form an inventory. Special lists for the use of salesmen are drawn up from the master inventory and lists are printed

for circulation throughout the trade as well as a record within the regional office. No item is sold for about one week after lists are circulated.

When a customer makes inquiry about a particular steel product, or other item by coming to

the agency offices, he is shown the full inventory of the product, and is invited if he wishes, to inspect all inventories. A sale may be closed in a personal visit at the salesman's desk. Many sales are completed by mail where the buyer selects items from the circulated lists, makes an offer, and it is accepted. The same thing applies to telegrams.

Return on surpluses sold is about 80 per cent of original cost in the case of the New York office. An attempt is made to sell all material at ceiling prices, but if the condition of the property is bad, or if specifications are not commercially desirable, lower prices are charged.

In the sales contract, information is required as to the declared unit cost estimated by the declaring agency, the OPA ceiling price, and the final sale price. If there is variation between the OPA ceiling and the price at which the article or consignment is sold, an explanation is entered on the copy of the sales contract retained by RFC.

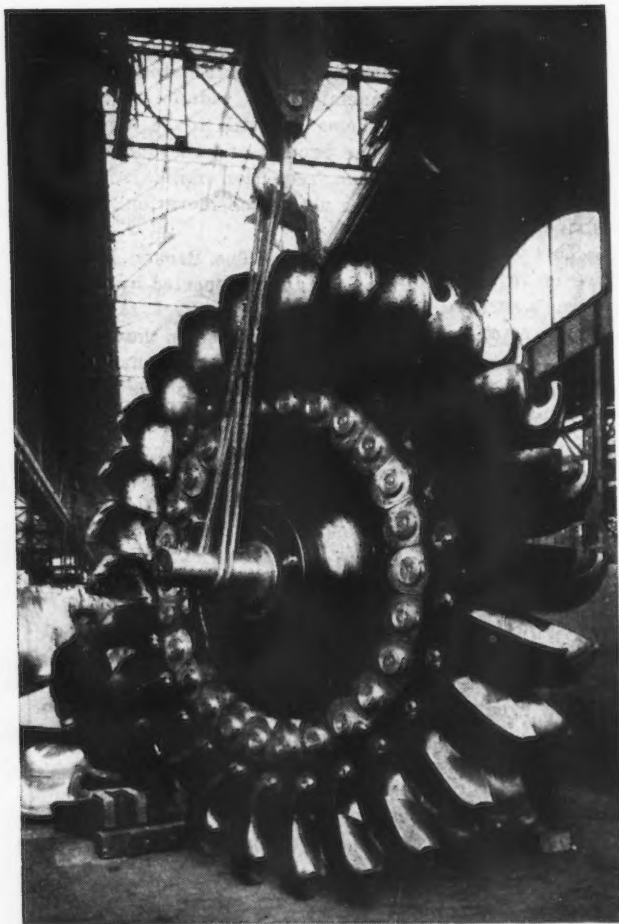
To protect the government against criticism for selling goods without adequate notice to interested buyers, inventory lists are circulated to representative sections of industry, and the sales contract requires that the number of offerings made to users, wholesalers, exporters and others be shown for the record.

To support the final price, which must be approved by the chief of the surplus division, OPA prices and freight charges must be shown on the sales contract. RFC will stand the cost of skidding and loading for shipment.

Other requirements of sale are that the buyer must have permission of the WPB regional office, a regular allotment, or a Z1 allotment, shipping instruction, terms of payment, WPB authorization, proposed use of the material, and location of the property together with the quantity, description, property condition and unit price of the property, are required to be shown in the sales contract for the record.

Steel lists for circulation are divided between carbon and specialty steels such as tool and alloys. Some of them are sent to as many as 7000 consumers. Small lots are made available to small companies, and it is planned to locate branch offices at strategic locations with duplicate inventories to make it easier for small companies to find out about the existence of surpluses. All property is offered subject to prior sale or withdrawal without notice.

The gold-fish bowl principle of permitting the public or anyone in indus-



BIG BITE:—This Pelton hydraulic turbine wheel was made by the Escher Wyss Works in Zurich, Switzerland.

...Out of the Blue!



• A design takes shape . . . the fabricated steel moves out on time . . . accurate workmanship and close adherence to "specs" the keynote . . . another satisfied customer! For accomplishing the unusual in the usual way is a matter of routine at Levinson.



The **LEVINSON-STEEL CO.**

33 PRIDE STREET

• PITTSBURGH, PENNA.

THE IRON AGE, March 8, 1945—121

HANDLING+Processing+HANDLING+Assembling+HANDLING+Packing+HANDLING+Storage+HANDLING

HANDLING—the Common Denominator of PRODUCTION



LET MEN DIRECT POWER—NOT GENERATE IT!



Planned production depends largely for its success on efficient materials *handling*. A handling operation starts each job, moves it along through processing and assembly to storage or shipment. Every other link in the chain of performance can rightfully be labeled "Handling."

Moving materials of all sizes, shapes and weights is a continuous process today. Modern, mechanized Towmotor brings a real solution to hundreds of handling problems. Mechanical help is necessary for profitable materials handling. Get the story—send for the Towmotor DATA FILE.



TOWMOTOR

THE ONE-MAN-GANG

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122—THE IRON AGE, March 8, 1945

NEWS OF INDUSTRY

try who is interested in finding out who has bought materials and at what prices is being put into operation. Soon records of all sales will be established within RFC regional offices and anyone who desires to inspect them will be permitted to do so.

Steel companies and consumers are consulted on the disposition of items which are difficult to sell because of unusual circumstances or characteristics. Sometimes items are hard to sell because quantities of the surplus are excessive and sometimes the use for which the item was originally intended has been abandoned by the government. In the latter cases, weird specifications, odd shapes and sizes are encountered.

Domestic sales are usually all cash but when prospective purchasers request credit, a 30 or a 60 day credit may be granted if credit investigation discloses a satisfactory rating.

Sales for export must be approved by FEA and as a consequence, the New York office has worked out a scheme whereby sales are conditional upon the purchaser getting an export license within three weeks, and removing the material within a month from the time the contract is signed. Extenuating transportation circumstances may be grounds for requesting and getting an extension of time for removal of the property.

When foreign sales are initially completed a 20 per cent down payment is secured pending FEA approval. If FEA disapproves, the down payment is refunded. If FEA approves, the remainder of the cash is payable.

Increasingly, credit is being extended to foreign purchasers who usually are represented by American export companies. Where RFC decides that a foreign purchaser has good credit, the agency will take a letter of credit and expect payment upon presentation of the bill of lading.

Buffalo Wages Up

Buffalo

• • • Average weekly earnings of factory workers in 173 plants of the area climbed to a new high mark in January, although employment in these plants dropped to the lowest level since May, 1942, according to a report of the Buffalo Chamber of Commerce on State Labor Department statistics.

The average weekly wage was \$56.50 in mid-January, against \$51.19 in December and \$53.22 in January, 1944. The previous peak was reached in November, when the average was \$55.08.

IF IT IS YOUR JOB ... TO TURN OUT SHELLS *on time*

BE GUIDED BY THIS PRODUCTION REPORT

This shell-turning production report clearly shows that America's metal-working industry has the inherent capacity to meet the requirements of the heavy shell program—provided that effective use is made of Kennametal, the tough, strong, steel-cutting carbide that contains an extremely hard intermetallic compound ($WTiC_2$), found in no other known tool material.

The finish-turning operation on 5500 shells, as described, required only 196 grams of Kennametal—about .036 gram per shell. This is representative of the economies effected on all shell-turning operations wherever Kennametal is used.

It is important to remember that Kennametal performance is predictable, under known conditions of use and maintenance, because its uniformity is precisely maintained by rigid chemical and metallurgical tests at every stage of manufacture.

Our field engineers are fully equipped to help you obtain maximum shell production, with minimum consumption of carbide, through proper application and use of Kennametal tools.

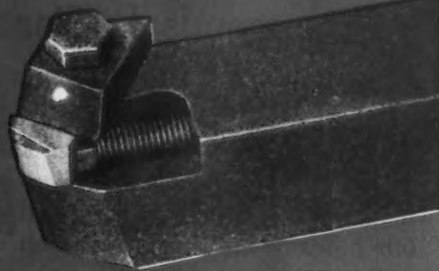
Catalog 44 lists addresses of field offices, and describes Kennametal. A copy is yours for the asking.



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SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

WAREHOUSES IN: CHICAGO DETROIT · PHILADELPHIA NEW YORK SAN FRANCISCO



ONE OF THE
GANG OF FOUR
TOOLS USED



KENNAMETAL TIP
WHEN NEW



AFTER FINISH-
TURNING OF 5500
105MM SHELLS

KENNAMETAL FINISH-TURNS 5500 105mm SHELLS at Carbide Cost of $\frac{1}{4}$ ¢ per shell

PLACE

One of America's most important shell-turning plants.

JOB

WORK PIECE: 105mm shell, forged steel, heat-treated to Brinell hardness of 370 to 390.

OPERATION: Finish-turning SPEED: 425 SFM
DEPTH OF CUT: .030" FEED: .017"

TOOLS

Gang of four tools, each having clamped-on Kennametal tip, Grade K3H, $\frac{3}{8}$ " x $\frac{1}{2}$ " x $1\frac{1}{2}$ ". Tips are advanced and resharpened until they become too small to clamp (see illustrations above). Chip control obtained by unusual carbide-conserving procedure that will be explained on request.

PERFORMANCE

5500 shells finish-turned during life of set of four Kennametal tips. One operator usually finish-turns about 550 shells per shift. High production rate maintained because tip breakage from operating or grinding strains is negligible.

COST

Tip cost per shell—approximately $\frac{1}{4}$ ¢. Amount of Kennametal used in finish-turning one shell—approximately .036 gram.

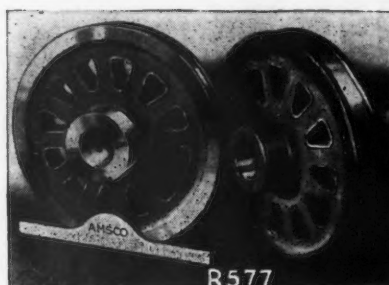
Manganese Steel's Combination of Properties Recommends It For Wheels and Rollers

Manganese steel wheels are by no means the lowest in first cost, particularly when extensive machining is necessary. Yet many maintenance men in steel plants and other heavy industries insist on manganese steel wheels for the rigorous jobs because they know that they will stand up under stresses and abrasion that quickly destroy ordinary wheels. These applications include transfer cars, charging buggies, scale cars, skip cars, larry cars, furnace pushers, conveyors, traveling cranes, yard cranes and ore unloaders. In such cases uninterrupted operation of equipment means cost savings far outweighing any superficial difference in price.

Familiar to experienced industrial men are the reasons for the superior performance of manganese steel in all services imposing severe stresses, heavy impacts and grinding abrasion on equipment wearing parts. The high tensile strength and ductility of austenitic manganese steel lend an unequalled toughness to the casting; and the remarkable capacity of the metal to work-harden

in service enables it to withstand abrasive wear. Manganese steel wheel treads quickly take on a hard, wear-resistant polish that greatly retards wear.

An advantage not so commonly known is that manganese steel wheels can forego lubrication more readily than the ordinary because of the hard, highly polished bearing surface that quickly develops.



The buggy wheels shown in pictures C-501 and R-577 are typical of hundreds made by Amsco for plants that could make their own wheels, but cannot afford to do so after critically comparing costs and records of lost production.

Send for Bulletin No. 543-G on Amsco manganese steel applications for general industry.



How Amsco-Nagle pumps ably handle thick, abrasive or corrosive liquids is described in Bulletin 940.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN
Brake Shoe
COMPANY

NEWS OF INDUSTRY

Britain's Prosperity Dependent on Rise In International Trade

New York

• • • The best hope of the world for a stable and peaceful future lies in a common and cooperative economic policy, to be pursued at least by Britain and the United States, by means of which the difficulties of each country may be solved through the prosperity of all.

Such is the belief of the Hon. H. R. Brand, Washington representative of the Chancellor of the Exchequer and the British Treasury, voiced here recently.

This prosperity can only be reached in Britain's case, however, said Mr. Brand, by the revival and increase of the export trade on which she depends for her very life, and which she has slashed below the minimum in order to wage war with all her strength.

Asserting that exports would have to be raised to 150 per cent of the 1938 volume to balance external income and expenditure, without providing for external debt service, Mr. Brand said world prosperity would be great enough for England to accomplish this result without fighting for a greater share of world trade.

Mr. Brand pointed out that during the war the United Kingdom has had to buy a large part of her needs, with the consequent depletion of her foreign resources and the contracting of enormous debts.

Mr. Brand continued, "in the United States alone England had spent about \$6 billions by March 31, 1943, and has continued to spend large sums since that date, amounting in 1944 to some \$1.3 billions.

"We have spent in Canada all our earnings of dollars and have found additional Canadian dollars by selling back to Canada sterling investments amounting to 700,000,000 Canadian dollars.

"In addition to having had to liquidate other large amounts of foreign investments, the United Kingdom has incurred liabilities to other countries which, calculated in dollars, amount to about \$12,000,000,000, and of course, we are still incurring liabilities, particularly in the Middle East and India. Altogether, we have sold \$4,000,000,000 of our United States and Canadian investments.

"Britain has given in mutual aid or reverse lend-lease, over \$2,800,000

CRACKS DOWN ON

CRACKED VALVES

SOLNUS OILS . . . eliminate hard carbon . . . compressor valves last 3 years instead of 1 month

Every overhaul today delays production tomorrow . . . and when it is an important piece of equipment such as an air compressor, reducing shutdowns is a "must."

Hard carbon formed, valves cracked and new ones had to be installed at least once a month on a single-stage, 40 pound compressor in a New Jersey plant. The compressor was "taken down" for cleaning every four months. Then the maintenance men took the advice of a Sun Oil Engineer — a switch was made to Solnus Medium Oil.

Now, valves last for three years instead of cracking and being discarded in one month.

Once a year the compressor is checked and cleaned. There is no hard carbon and valves are practically clean.

Reduce shutdowns in your plant by eliminating the unnecessary overhauls that are often caused by faulty lubrication. Solnus Oils, with their high lubricating and wear preventing qualities and Sun Oil Engineering service, offer you a combination proved by hundreds of industrial plants to be the answer to keeping production at its peak. Call in your local Sun Engineer today or write to . . .

SUN OIL COMPANY • Philadelphia 3, Pa.
Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO

SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY



**MANEUVERABILITY • ADVANCED
DESIGN and RUGGED CONST-
RUCTION** *are embodied in*
EUCLID HOISTS

Expert Euclid hoist design, plus an efficient clam shell bucket, make this a very compact and useful unit for loading, unloading and conveying coal, ashes and other materials.

This trolley is built to handle a single line bucket and travels along the overhead beam during each cycle of operations. The photo shows the trip line in front of operator. A pull on this line opens the bucket.

Euclid convenience of control and facility of operation contribute greatly to its high efficiency and comparatively low cost of operation.

In addition to the building of cranes and hoists Euclid experience embraces the designing of equipment to handle various types of related equipment, grabs, slings, etc., for handling unusual kinds and shapes of material.

THE EUCLID CRANE & HOIST CO.
1361 CHARDON RD. EUCLID, OHIO



**WE CAN
DELIVER**

a limited number
of 5 to 10 ton
cranes in 60
to 90 days

000 to the United States and about \$1,960,000,000 to other Allied nations."

Britain's vast indebtedness to many countries which had resulted from this policy can only be redeemed over a long period of time, said Mr. Brand; and to do this and pay for her essential imports, Britain must increase exports to 5 times the present figure.

In the opinion of Mr. Brand, certain factors will make this increase possible. One is the constantly increasing wealth production which is characteristic of the present age—a fact which should enable the standard of living to be increased everywhere with a wider demand for such goods as Britain is able to supply to the world markets. There is also the fact that creditor nations the world over will have their sterling credits, acquired during the war, with which to purchase British products.

**Treasury Barring
Speculators at Farm
Equipment Selling**

Washington.

• • • Farm equipment and construction machinery was offered for sale at Kearney, Neb., recently, the sale being conducted by the Kansas City Regional Office of Treasury Procurement's Office of Surplus Property.

Among the 950 items of equipment being offered for sale were 85 tractors, 76 graders, 83 scrapers, 35 concrete mixers, 8 shovels, 182 snow plows, 29 material spreads, 82 material buckets, 47 compressors, 12 cranes, 140 pumps, 10 pavers, and 125 pieces of farm equipment, including hay stackers, rakes, mowers, discs, harrows and plows.

A full page brochure announcing the sale was mailed to a nationwide directory of construction machinery and also farm equipment dealers.

"On-the-Spot-Bid-Method" was used in the sale of this equipment. This is a simplified, speeded-up selling method aimed at solving the joint problems of fostering the wide and equitable distribution of surplus property, obtaining a fair price for the government consistent with present market conditions, discouraging disposal to speculators and creating a fair and competitive method of distribution.

The sale was handled by government-trained employees from the Kansas City Regional Office of Treasury Procurement.

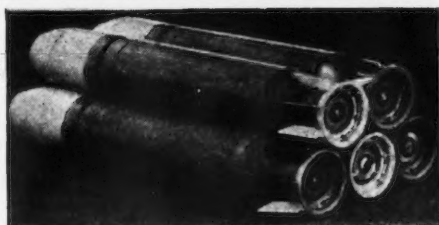
The equipment, located at the Treasury Equipment Yard, five miles east

ROCKETS

*the NEW "FLYING
ARTILLERY!"*



U.S.A. & P. PHOTOS



Oakite cleaning materials and methods not only are at work helping contractors attain volume production of rocket shells shown here, but help the U. S. Victory Program on . . .

Large and Small Caliber Shells
Bombs • Detonator Caps
Airfield Landing Mats
Land Mines • Anti-Tank Mines
Mortar Shells and Tubes
Cartridge Clips • Powder Boxes
Machine Gun Barrels and Parts
Flare Bomb Cases
Bursting Tubes • Shell Ogives
Booster Caps
Fin Assemblies
Fuse Bodies and Parts

OAKITE CLEANING

*Materials and Methods Help
Contractors Meet Production Demands*

The Oakite organization helps the Nation's prime contractors expedite volume production of this sensational new weapon.

Time tested by war's exacting demands, Oakite materials and methods speed essential cleaning operations on rockets by effectively removing scale and rust, preparing the surface and otherwise conditioning rocket bodies prior to painting. Welding flux, grease, dirt and emery dust are removed from intricate, close-tolerance machined parts, and fabricated components.

All time-saving production "musts" and tough inspection standards are hourly being met all along the line by Oakite materials and methods.

Personal Advisory Service

Our Technical Service Representative near you has a wealth of war-time experience with cleaning practically all types of Army and Navy matériel. A partial listing of items is shown at the left. If you have a cleaning problem, ask to have the Oakite representative call. Should you write us direct, please give brief details of your problem.

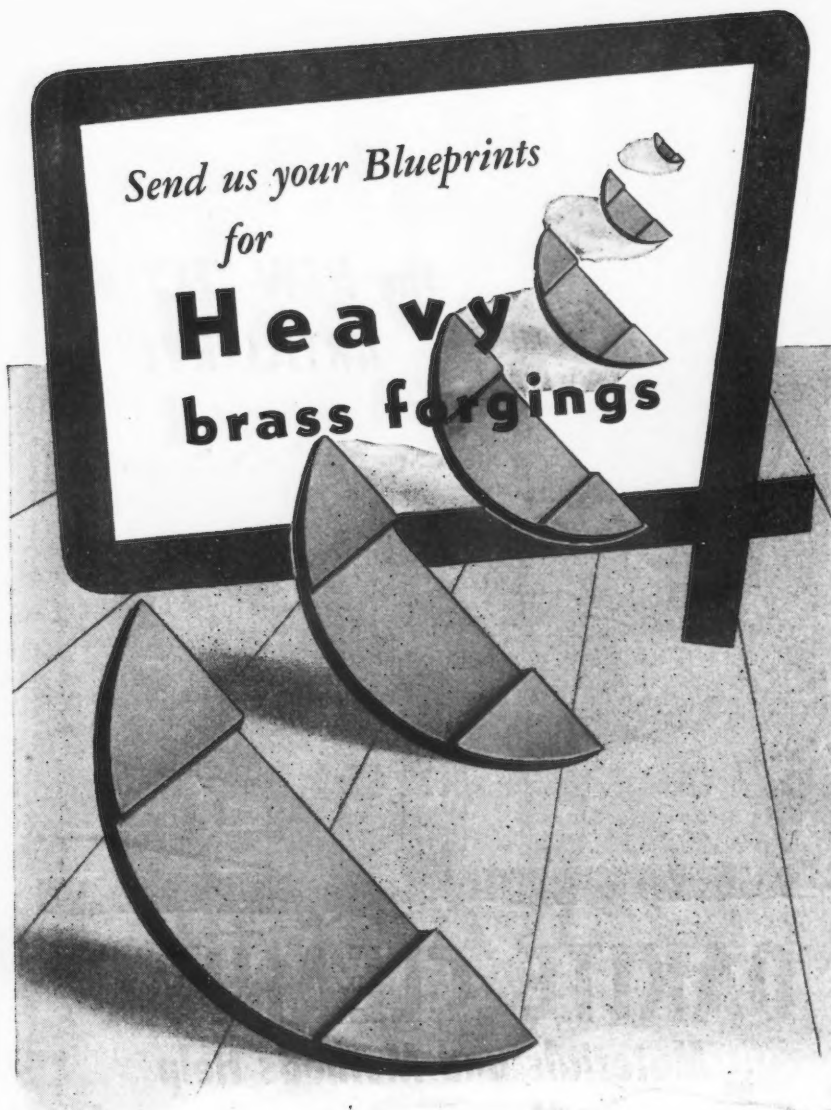
OAKITE PRODUCTS, INC., 14A THAMES STREET, NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE
MATERIALS...METHODS...SERVICE



CLEANING
FOR EVERY CLEANING REQUIREMENT



★ TITAN METAL MANUFACTURING COMPANY now has some open capacity for heavy Brass Forgings (up to 100 pounds.)

Owing to the unusual demands for war materials, we have stepped up our forging capacity and are now manufacturing brass forgings, ranging from 1/4 oz. to 100 lbs. The accompanying illustrations show a 1/4 oz. TITAN brass forging and a 26 lb. TITAN brass forging.



Note: The only open capacity we have is for very heavy brass forgings.

We welcome the opportunity to serve you



Titan



METAL MANUFACTURING CO., BELLEFONTE, PA.
NEW YORK • CHICAGO • SAN FRANCISCO

Quality Alloys By Brass Specialists
Brass and Bronze Rod • Forgings • Die Castings • Welding Rods

of Kearney, was available for inspection Feb. 19 and 20.

Contractors, builders, and all users of construction equipment, as well as farmers and users of farm and agricultural equipment and all other interested persons were welcome, but only qualified dealers in construction and farm equipment were invited to bid.

Upon arrival at location of equipment, all builders were given Circular No. 190, describing and numbering each article for sale. Each piece of equipment was numbered to correspond with the listing in the circular.

Following the inspection period, the bidders assembled in the Armory Building in the city of Kearney. Bids were requested on a single lot basis as they appeared in the circular. As each item was announced for sale by Treasury's representatives, a bidder turned in bid cards showing the amount of his bid, firm name and article. Awards were made immediately and the successful bidder and the amount of bid was announced publicly at the sale. At the conclusion of the sale each day, the buyers signed contracts, paid for the equipment and arranged shipping instructions with the custodian of the yard.

Westinghouse Executive Sees 1500 Miles an Hour Airplanes

Buffalo

• • • Recent experiments have removed rockets and jet propulsion from the realms of fantasy and have opened up vast fields of potential power for transportation, G. Edward Pendray, assistant to the president of the Westinghouse Electric & Manufacturing Co., told the Engineering Foundation of Buffalo at a recent meeting.

"Jet propulsion and rocket power," Mr. Pendray said, "will provide new altitudes and new velocities for flight, new power for aircraft and new devices as important and revolutionary as the invention of the airplane."

Airplanes three to four times as large as those of today, that will travel "up to 1500 miles an hour" are possible he declared. That would mean crossing the Atlantic by air in less than three hours, he pointed out.

"The gas turbine," he said, "is maturing so rapidly that in a few years we may see it driving planes, locomotives, ships and electric generators."

Mr. Pendray, a founder and former president of the American Rocket Society, is now its secretary and a member of the board.

Why IT'S USED BY PAINTERS EVERYWHERE!

NEOCETA

... THE NEW
SCIENTIFIC BRISTLE FOR
A BETTER PAINT BRUSH



HOLDS MORE

Each Neoceta bristle is channeled to hold more paint. High carrying capacity. Fewer dips. Less fatigue.



SPREADS BETTER

Neoceta bristles brush out well. Carry and spread paint evenly over maximum area. Not limp. Not too stiff.



WORKS EASIER

High capacity—perfect balance plus fewer dips—less effort. Light stroke—little brushing.



FINER FILM

Perfectly tapered Neoceta bristles lay paint smoothly.



LONG LIFE

Neoceta stands up under hard service. May be used in all oil, casein and water paints, varnish base enamels, varnishes and shellac. Cleans easily.

WORTHY COMPANION OF THE FAMOUS *Gold Stripe* BRUSHES

PITTSBURGH
PLATE GLASS COMPANY
Brush Division

6 YEARS RESEARCH

Back of every Neoceta brush is six years of scientific research—four years of actual use by master painters from coast to coast. Send for the scientific facts in the booklet "The Fascinating Story of Neoceta".

REPRESENTATIVE LINE OF NEOCETA BRUSHES NOW AVAILABLE • SEE YOUR NEAREST "PITTSBURGH" BRANCH

Owning Agencies To Control Surpluses In Overseas Areas

Washington

• • • Having the effect of rescinding the authority heretofore vested in the Foreign Economic Administration the Surplus Property Board has issued Temporary Regulation A assigning disposal functions in foreign countries to the owning agencies. FEA now will have disposal authority only as it applies to its own property and lend-lease surpluses.

The new order, SPB said, is intended to assure prompt action to organize the disposal of surplus property in foreign countries. While the temporary regulation applies to all owning agencies and affects all surplus property abroad, except merchant and naval vessels, SPB pointed out, it was drawn at this time so that the Army and Navy, the largest holders of the surplus property, may take immediate steps to handle the growing volume of surpluses in non-combat areas. Commanders in combat areas as heretofore, have full powers over all military property in their areas.

The Army and Navy have set up a joint organization called the Office of Army-Navy Liquidation Commissioner to carry out their responsibilities under the temporary regulation. Thomas Bayard McCabe, Philadelphia, has been designated Liquidation Commissioner. The Army has assigned Maj. Gen. Donald H. Connally, former commanding general of the Persian Gulf Command as Deputy Commissioner and the Navy has assigned Rear Admiral William Brent Young, Chief of the Bureau of Supplies and Accounts, as Assistant Commissioner.

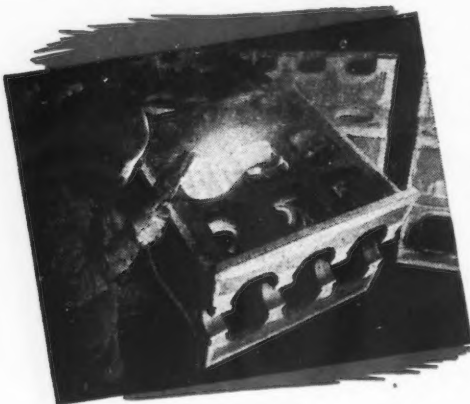
It is the policy of the Surplus Property Act to prohibit so far as feasible and necessary the importation into this country of surplus property sold abroad. The temporary regulation is drawn to carry out this provision with respect to property produced in the United States, but stipulates that it shall not apply where the purchaser certifies that the property will be shipped back to the original manufacturer or will be consigned to some other person or firm in the United States for the purpose of reconditioning for subsequent re-export. Members of the Armed Forces are allowed to purchase surplus property abroad and bring it into this country for their own use.

The temporary regulation provides



If a carrier pigeon could talk, what experiences he could relate, trained as he is to "Deliver".

If a complete roster of products and parts fabricated at United Welding since 1913 were compiled, what a welding story it would tell. They would include:

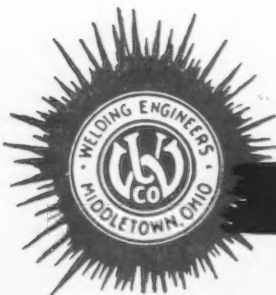


Horizontal press frames
Five station multiple drill bases
Multiple drill beds
Boring mill bases
Hydraulic press frames
Gear blanks
Gear guards
Mobile crane top decks
Crane center trucks
Diesel engine frames
Diesel engine gear housings
Blower impellers
Blower casings
Pressure vessels
Jib arms
Field rings
Exhaust manifolds for Diesels

FOR PAPER MILLS

| | | | |
|----------------|---------|-------------|-----------------------------|
| Settling tanks | Tanks | Beater tubs | Pulleys, etc., in stainless |
| Rewinder drums | Troughs | Vats | steel, Everdur, etc. |

Today-tomorrow-someday—you may require the experience, equipment and skill of responsible fabricating welders. When that day comes, submit your drawing for estimates or call a United engineer in consultation.



THE UNITED WELDING CO.

MIDDLETOWN, OHIO

WELDING FABRICATORS OF MODERN DESIGNS

SHAFAER "DE" 22000 BEARINGS

SELF-CONTAINED

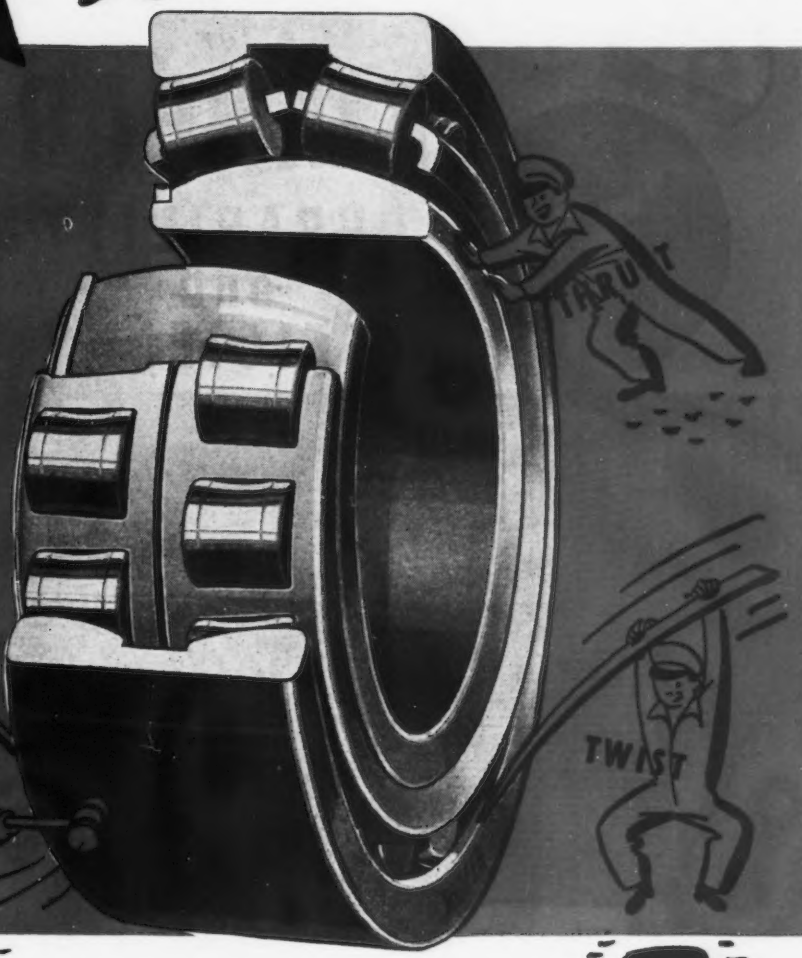
SELF-ALIGNING

SELF-CENTERING

under heaviest loads

and adverse

operating conditions



Any experienced engineer recognizes that *most* bearing installations *must* encounter shaft misalignment and deflection... end and radial thrust and even heavy shock loads. And more and more engineers are recognizing that only Shafer ConCaVex Bearings have the design and construction that keep them free-rolling, self-aligning and self-centering under *all* such conditions at *all* times. For only Shafer Bearings combine the ball bearing and roller bearing con-

struction... only Shafer Bearings combine the low rolling friction of a ball and the high load capacity of a roller. Only Shafer Bearings have such an outstanding record of service on the *tough* installations for the past 25 years. Ask the men who **KNOW**. SHAFER BEARING CORPORATION, 1422 West Washington Blvd., Chicago 7, Illinois.

The Basic Shafer Idea

Shafer ConCaVex Self-Aligning Bearings combine the advantages of both ball and roller bearings. A Shafer Bearing utilizes the effective contact area of a ball many times its size... providing automatic end-thrust absorption, superior shock resistance and long life.



1. SHAFER "DE" 22000 SERIES

The self-contained bearing, preadjusted, ready to install, easy to install. Has one piece outer race, two rows of rollers and single inner race for compactness. Maximum capacity.

2. SHAFER DOUBLE ROW BEARING ASSEMBLY

for building into machines, power transmission equipment, etc. Two outer races, two roller assemblies. A single inner race.

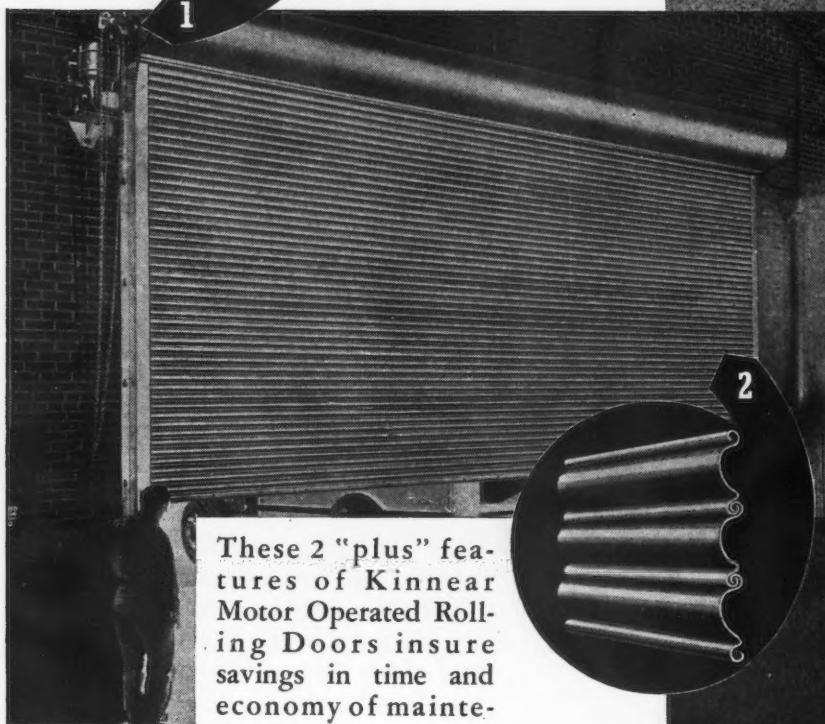
3. SHAFER SINGLE ROW BEARING ASSEMBLIES

One outer race, one row of rollers, one inner race. Self-aligning with radial and thrust load capacity.



SELF-ALIGNING ROLLER BEARINGS

2 BIG REASONS for KINNEAR DURABILITY and EFFICIENCY



These 2 "plus" features of Kinnear Motor Operated Rolling Doors insure savings in time and economy of maintenance.

1. The heavy duty power unit that goes instantly into operation when you touch the control button, assures time-saving operation of the Kinnear Door. Remote control switches may be located at any convenient point, saving steps and heat, and increasing convenience.

2. The interlocking steel slats—originated 46 years ago by Kinnear—are both flexible (for ease in rolling) and rugged (to withstand the elements and years of hard usage). Many of these interlocking steel slat doors are still giving carefree service after 20, 30 and 40 years of continuous use.

In addition to these advantages the Kinnear Steel Rolling Door opens out of the way; saves wall and floor space, clears ground obstructions and when closed provides an all-metal barricade. Their straight-line design harmonizes with any architecture. They are individually built to fit the opening—any size—for all old or new buildings. Write to The Kinnear Mfg. Co., Factories: 1760-80 Fields Ave., Columbus 16, Ohio, 1742 Yosemite Ave., San Francisco 24, Calif.

**SAVING WAYS
IN DOORWAYS**

KINNEAR
ROLLING DOORS

that proposed foreign sales of plants, pipe lines and other installations which cost the government \$1,000,000 or more, and patents, processes, techniques or inventions, irrespective of cost, are to be submitted to the Attorney General for his opinion as to the applicability of the anti-trust laws. Likewise, SPB is also to be informed as soon as negotiations for the disposal of this type of property are started.

The act provides that the board and the disposal agencies shall report to Congress on such surplus property costing over \$5,000,000 as aluminum plants, magnesium plants, synthetic rubber plants, chemical plants, aviation gasoline plants, iron and steel plants, and pipe lines. A provision is made in the act, however, that disposals may be made, without report to Congress, of aircraft plants, shipyards, transportation facilities, radio and electrical equipment. The temporary regulation specifies that this type of property in foreign areas may also be disposed of without report to Congress.

Industry-by-Industry Solution for Surplus Problem Under Study

New York

• • • Government should not adopt an over-all policy for disposal of all types of surplus property, but should consult with industry committees as to the best possible solution for each major industry, according to a majority of top business executives polled by *The Conference Board Business Record*.

The solutions proposed, based upon the executives' study of postwar prospects of their own industries, fall into three general groups—gradual disposal, immediate sale in the domestic market, and export.

Machinery and machine tool builders believe that liquidation of government surpluses of their wartime products must be gradual and that it should take place through normal trade channels. The viewpoint of these executives, which is generally representative of the capital goods industries, is that unused parts should be returned to the original manufacturer, at least to the extent that he is able to assimilate them, and complete machines returned to the manufacturer or consigned to him for sale through regular distributive channels. One suggestion is for 25 per cent of sales to be taken each year out of the

RACO



MILD STEEL ELECTRODES

| | | |
|-----------|--|------------|
| Type—RACO | 7, All Position, Reversed Polarity . . . | AWS E-6010 |
| " | 11, All Position, A. C. . . . | AWS E-6011 |
| " | 8, General Purpose, Poor Fit-up . . . | AWS E-6012 |
| " | 13, General Purpose, Light Gauge . . . | AWS E-6013 |
| " | 20, Horizontal Fillets . . . | AWS E-6020 |
| " | 5, Deep Grooves . . . | AWS E-6030 |

HIGH TENSILE STEEL ELECTRODES

| | | |
|-----------|---|------------|
| Type—RACO | 74, All Position, Reversed Polarity . . . | AWS E-7010 |
| " | 64, Horizontal Fillets . . . | AWS E-7020 |

STAINLESS STEEL ELECTRODES

| | | |
|---------------|--|----------|
| Type—RACOLLOY | 18-8, Unstabilized . . . | Type 308 |
| " | 18-8Cb, Stabilized . . . | Type 347 |
| " | 18-8(1.5% Mo) . . . | Type 316 |
| " | 18-12(2-3% Mo) . . . | Type 317 |
| " | 18-12(3-4% Mo) . . . | Type 307 |
| " | 19-9, For Welding air-hardening steels . . . | Type 309 |
| " | 25-12, Unstabilized . . . | Type 310 |
| " | 25-12Cb, Stabilized . . . | |
| " | 25-20, Scale-resisting steel . . . | |

HARD SURFACING ELECTRODES

| | |
|-----------|--|
| Type—RACO | 25, 20-25 C Rockwell (Machinable Deposits) |
| " | 45, 40-50 C Rockwell |
| " | 55, 50-60 C Rockwell |
| | RACOLLOY Manganese, Austenitic Manganese Steel |

LIGHTLY COATED ELECTRODES

| | |
|--|------------|
| Type—Blue Label, Sull Coated, Manual Welding . . . | AWS E-4510 |
| Type "D" Automatic or Manual Welding . . . | AWS E-4520 |
| Type "D" .30-.40 C, For surfacing . . . | |
| Type "M" Automatic Welding . . . | AWS E-4520 |

OXY-ACETYLENE WELDING RODS

| |
|--|
| Type—Red Label Copper Coated Mild Steel |
| Red Label Copper Coated Pure Iron |
| RACO High-Tensile, For High-Tensile Steels |

SEND FOR YOUR COPY OF OUR NEW CATALOG JUST OFF THE PRESS

The **REID-AVERY COMPANY**

DUNDALK BALTIMORE 22 MARYLAND

SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

NOTICE TO MANUFACTURERS' AGENTS

The REID-AVERY Company has a few very attractive territories open. Write for complete details.



Clean and lubricate your chain!

... LENGTHEN ITS LIFE

Here's one good method. Clean your chains regularly. Wipe the links clean, then apply grease or heavy oil mixed with graphite. • Note this exception: Chains should be cleaned but not be lubricated when they come in contact with dirt and sand. • Select good chain (of course we recommend American), care for it regularly, and you'll obtain excellent service. • The highest possible preference rating should be obtained and shown on orders placed for chain.

• USE WELDLESS CHAINS

Weldless Chain is being substituted successfully in many applications, for smaller sizes of welded chain and manila rope. From time to time we have open equipment for manufacturing the following types of weldless chains and attachments: **Tenso, Lock-link, Jack, Register, Safety**, in steel and brass; **American Pattern**, in steel; **Sash**, in steel and bronze. **Attachments**—"S" hooks, rope snaps, swivel snaps, rings and special designs. Write for information.

ACCO

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Bridgeport, Conn.



**AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE**

In Business for Your Safety

government's surplus stocks until they are completely liquidated.

One advocate of gradual disposal, whose view is shared by scores of executives, declares:

"If industry is going to provide reasonably full employment in the post-war years, there will have to be a definite freezing of some surpluses for periods determined by the nature of the surplus material and the annual peacetime consumption."

Many executives of nondurable goods industries and iron and steel products call for rapid liquidation of the surpluses. A manufacturer of iron and steel products declares, "the more that nature is allowed to take its course in the distribution of surplus property, the better off the country is going to be in the long run. An inventory hanging over the market has a permanent bearish factor, whereas its sale hurts the market only once."

The survey revealed general agreement that surplus materials located in foreign countries at the termination of hostilities should be disposed of in those countries rather than returned to the domestic market. Many of the executives favored exporting materials that might otherwise find their way into speculative channels.

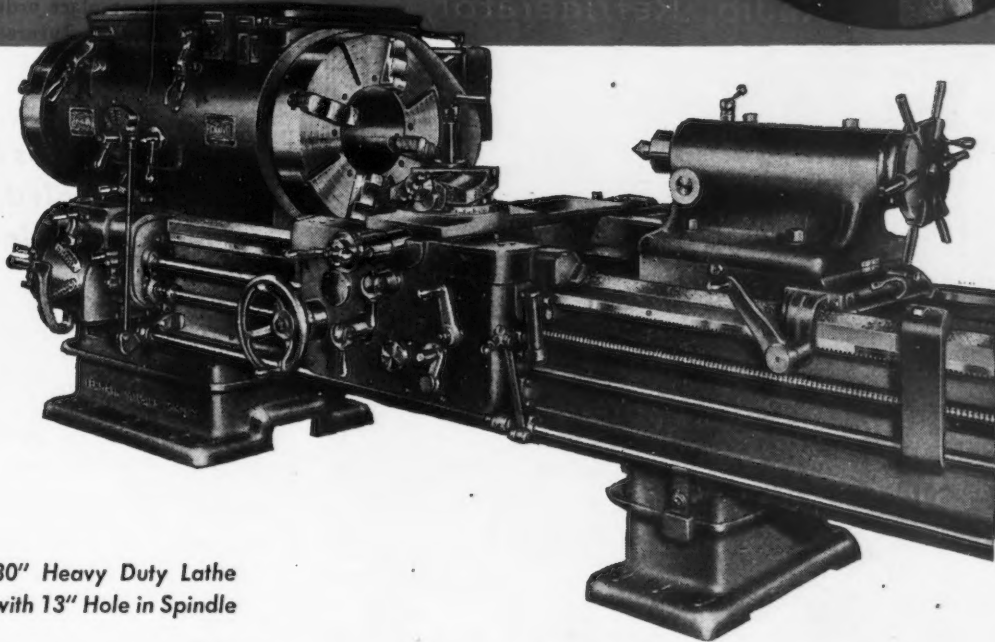
Many replies complained of the injection of the Department of Justice into the surplus disposal program. "There will have to be a good deal of cooperative endeavor," according to one executive, "and we shall all have to be worried as to whether what we are doing constitutes actionable combination in restraint of trade."

Objections were widespread to the government's terms of sale. Listings have been found inadequate, lots are stored in different locations without being so listed, and stocks are not available for inspection despite the requirement of cash in advance "without recourse."

Because of these objections, "contractors are at present hesitant to bid and as a result new orders are being placed for items of which there are government surplus stocks."

Other criticisms occurring frequently in the replies were that undue hesitation and procrastination have been prevalent on the part of the services in reaching a decision to dispose of many surpluses, that the government practice of having a three-man board is unsound, and that the present tendency to make priority offers of surplus property to charitable and other organizations and to small business delays disposal. It is also felt

***We Won't Get Faster
Production Until We
Get a Hydratrol Lathe***



30" Heavy Duty Lathe
with 13" Hole in Spindle

Hydratrol Lathes

LARGE HOLLOW SPINDLE TYPE

For Faster Production...Better Work...Lower Costs!

Look around your own shop—you may find a number of machining jobs which could possibly be done better on a Large Hollow Spindle Type of HYDRATROL LATHE. Send us prints of these unusual, difficult, or too-costly machining jobs, for a time-and-money-saving recommendation.

5 Sizes-18" to 36"


Small 18" up to 7 1/4" Hole
Medium 24" up to 12" Hole
Large 27" up to 13" Hole
Large 30" up to 14" Hole
Large 36" up to 16 1/2" Hole

(Standard type lathes, 16" to 36")

Lehmann MACHINE COMPANY

CHOUTEAU AT GRAND . . . ST. LOUIS 3, MISSOURI

★ The *Grammes* Organization
has reached its 70th milestone.
During this long and useful life
it has served the Automotive,
Electrical, Radio, Refrigerator,
Gift, Toy . . . and other Key
industries as Contract Manu-
facturer of Metal Products
and Assemblies.

For the past Four Years it
has devoted its talents and
maximum efforts to war pro-
ducts . . . and earned the 

We hope for Victory soon
. . . . when all our talents and
increased facilities again will be
available for industry.

★ L. F. GRAMMES & SONS, INC.
ALLENTOWN PENNSYLVANIA ★

that there is too much uncertainty about how much more similar property might become available and the price it might bring.

One executive urges "full knowledge of all government-owned plants which are to be sold, with details of tools and equipment; how soon after V-day they could be occupied; and other pertinent particulars which would enable industry to plan which plants it might be willing to purchase.

"Present uncertainty may lead many firms to plan construction of new facilities in the immediate post-war period; or place orders with machine tool manufacturers—both to the detriment of a market for government surplus facilities."

Crawford Claims He Was Misquoted; Says Manpower Not So Bad

Milwaukee

• • • Frederick C. Crawford, head of the Thompson Products, Inc., Cleveland, and a former president of the National Association of Manufacturers, came to Milwaukee to talk to some 1000 members of the Milwaukee Association of Commerce and, incidentally, straighten out some of his critics who "misquoted" his report of what he saw on a recent tour of the western battle front.

The effervescent spokesman for industry talked very freely of "unrealistic censorship," the manpower situation, postwar planning and his theories on labor management cooperation to a reporter for *The Milwaukee Journal* while he bounced around in the presidential suite of the Schroeder Hotel.

"Yes, sir," he beamed, "the manpower subject is a hot one right now. But it is less serious than it is made out to be. Why, do you know they talk of a shortage of 146,000 men in critical work in the nation? That's only one-fourth of 1 per cent of the working force of America. It is interesting to compare that with the national absentee rate of 6 per cent."

"And why did people leave critical plants? Because high government and army leaders thought the war was over and said so; because they proved it by canceling orders drastically and then delaying placing new orders as people were laid off.

"As if that wasn't enough, Congress debated the scandals of surplus all summer and then last Fall debated postwar unemployment problems as though they already were present.

Follansbee

offers a combination of *Service* and *Quality*



**COLD
ROLLED
STRIP**

When your requirements call for Cold Rolled Strip to exacting specifications—and speedy delivery is also imperative—Follansbee offers that hard-to-find combination of service and quality which enables you to maintain your production schedules and your own high product standards.

You will find Follansbee Cold Rolled Strip precision rolled to the exact temper, gauge, width and finish your specifications demand. And Follansbee's skilled organization possesses a flexibility which frequently permits the adjustment of mill schedules to serve in extraordinary situations.

It's a good plan to satisfy yourself on Follansbee quality *now*, even before you're pressed for time on delivery. Then, should you need hurry-up service, you'll feel free to rely on Follansbee commitments on delivery.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES • PITTSBURGH 30, PA.



Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Houston, St. Louis, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants*—Follansbee, W. Va. and Toronto, O.

ALLOY BLOOMS & BILLETS, SHEETS & STRIP • CLAD METALS • COLD ROLLED CARBON SHEETS & STRIP
POLISHED BLUE SHEETS • ELECTRICAL SHEETS & STRIP • SEAMLESS TERNE ROLL ROOFING

R-S FURNACE DESIGN

QUALITY PRODUCTS
SINCE 1908SAVES
TONS OF STEEL

The specifications for three large Heat Treating Furnaces called for a considerable amount of steel. R-S Engineers altered the design of the furnaces which resulted in a saving of 15 tons of critical materials and a cash saving to the purchaser without any reduction in operating efficiency. Furthermore, the furnaces were placed in operation on essential war material at least six weeks ahead of the specified operating time.

Another R-S project demanded a unique design and novel material handling arrangement to heat treat steel castings for American tanks. It involved precise temperature control, as well as timing the speed of handling to coordinate all cycles of an intricate heat treating process. The desired ballistic and metallurgical properties were achieved with a minimum of manpower. Many steel foundry men consider this one of the most outstanding installations of its kind in the country. It has produced thousands of tons of vital war material on schedule.

You can depend on R-S Engineers to design a furnace skillfully so that the desired physical properties of the finished work will meet all requirements; to save critical materials and manpower wherever possible; to make delivery promptly.

If you have an industrial heat treating problem, write on your company letterhead for helpful suggestions.

R-S Furnaces of Distinction

FURNACE DIVISION
R-S PRODUCTS CORPORATION

4524 Germantown Avenue • Philadelphia 44, Pa.

BUY WAR BONDS

Another reason was the fact that the national 48-hr. work week has drifted down to 45½ hr. due to a policy of social reform which seems to have become more important than the war.

"What did the intelligent worker do? Naturally, he decided that he had better get into work that showed promise of postwar security. Industry believes that if orders were placed promptly and we advertised widely the fact that there were more orders in 1945 than there were in 1944 the American workers would go back and there would be no problem—there's no need for any 'work or fight' bill. Industry and labor agree on that. They and the farm group believe that if there were a voluntary system, supplemented by giving local manpower committees authority to enforce orders on labor ceilings, there would be no shortage."

As for labor-management cooperation after the war to insure postwar production at levels set by planners, Crawford spoke angrily of those who thought that there was a lack of such cooperation.

"Look how we cooperated. We are only 6 per cent of the world's population, yet we have poured out countless millions of items to England and to Russia. We're knocking the daylights out of the Japs and the Germans. What is wrong with that cooperation?"

"When capital and labor holler at each other it looks like confusion. But look under the table, please, and see what was accomplished. That's where Hitler was completely fooled. That is what is so wonderfully American—I hope it continues. It has only been a short time in the history of the world that people were able to argue and shout and quarrel and *produce*—that is the history of America. And look what we did!"

Crawford stepped into a particular hornet's nest shortly after his return recently from a tour of the western front with other industrialists. He told America upon his return that he saw "fat cattle and horses" in France and that the Ritz Hotel in Paris still had all of its "big brass doorknobs."

"I was misquoted," he explained. "Sure, I mentioned the fat cattle and horses and the doorknobs and brass and copper material I saw there. But it was only to prove that America hasn't been told the true story. What I meant to show was that, despite the things we are told, the Germans—not the French—still had plenty of material and couldn't be nearly as bad off as we were led to believe."

Attacking this "optimistic censor-

Water-resistant packaging



Holding rivets



Wire identification



Sealing and identifying



Stock control



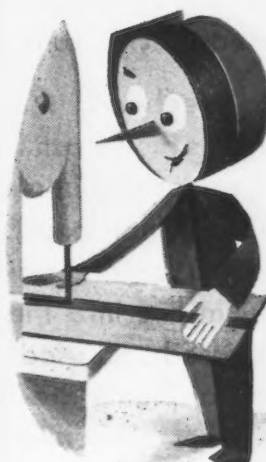
Color coding



Masking



Chip-proofing



Tape does it better

And users tell us that *FILMONIZE* Tape does it better yet. It has no "curl back"—no tangle—no waste. It stands the gaff longer—on or off the roll—and even under the most adverse conditions. It seals instantly, without water—speeds production—cuts down costs.

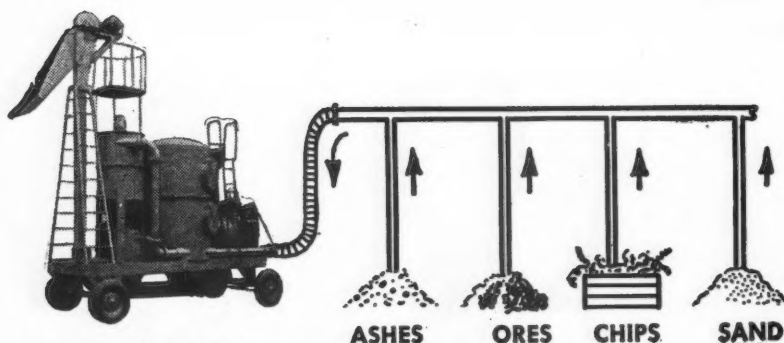
Are you making full use of tape?

Let your distributor tell you how others use it—and you're bound to see some excellent applications for it in your own shop. Look at the complete *FILMONIZE* line—Transparent Tapes, Colored and Multi-Colored Tapes, Printed Tapes, Riveting Tapes, Identifying Tapes, Splicing Tapes, Acetate Fibre Tapes, Metal Tapes, Specialty Tapes. All in widths of ½" to 18".



Filmonize
TRADE MARK REG.
SELF-SEALING TAPES

INTERNATIONAL PLASTIC CORPORATION
MORRISTOWN NEW JERSEY



VACUUM *is now* THE BIG CONVEYOR

Instead of ounces and cubic feet, the material which can now be removed by large Spencer Vacuum units is measured in tons and carloads.

In a steel mill, the Spencer Portable shown above removes the fly ash from the checkers of an open hearth and deposits it in a car for disposal at savings of hundreds of man hours. Blasting sand, used in ships for cleaning before painting, is removed by lowering a vacuum line into the hull. Glass and foundry sand is recovered and used again. Heavy ores and the chips in metal plants are gathered and deposited in receptacles for convenient disposal.

Vacuum is a tool, like compressed air, except that it does not spread dust but collects the materials for easy salvage, sorting or removal.

Every plant can use Spencer Vacuum in a dozen ways—from stock room to bench work, assembly, painting and final inspection. It cleans floors, walls and ceilings as an extra dividend.

Stationary units can be piped to any part of the plant or Spencer portables from 1½ H.P. up can be moved easily from room to room.

Ask for bulletins.

SPENCER VACUUM
HARTFORD
CLEANING
THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

NEWS OF INDUSTRY

ship," Crawford asserted recently: "France is in a mess. If America isn't given to understand what is happening abroad it will go isolationist again."

Industry wants to help here at home, too, Crawford added. He explained that the war had driven our industrial machine "off of the main road and onto a side road."

"We want to help get everything back on the main road," he explained, "but business doesn't want any back seat driving. Sure, the NAM has been attacked as too conservative. We in business have to be. Somebody is always sitting in the back seat and telling us to try this road or try that road. We have to say no because we know those aren't the right roads."

In the larger sense, however, it was Crawford's opinion that getting back on the "right road" would not prove too difficult. He mentioned the "wonders of the postwar world" and added that postwar plans of industry in general were "good."

"And remember that 75 per cent of industry does not have a serious conversion problem," he added. "The steel companies will keep on making steel; the oil companies will keep on with their oil business. Even in the automobile industry we can expect cars within 90 to 180 days."

Editor Sees America's Industrial Supremacy Becoming Expendable Pittsburgh

• • • Time and war are playing havoc with two of three principal elements that have gone into making the United States industrially supreme.

"Our raw-material resources and our ability to outproduce by mass-production methods are disappearing," Charles A. Scarlott states in "Engineering Highlights," a review of the year's developments in engineering. Mr. Scarlott is editor of the *Westinghouse Engineer*, a technical magazine.

The third main element which has brought goods bearing the symbol "Made in U. S. A." to top prominence in world trade—technical skills—is a resource that is not expendable, he asserts, and on this quality of our nation rests its continued leadership.

"The war rudely jolted us into realizing that our natural resources are not inexhaustible, as once thought," Mr. Scarlott points out. "Our forests have been depleted. The end of our rich, easy-to-get surface strips of iron

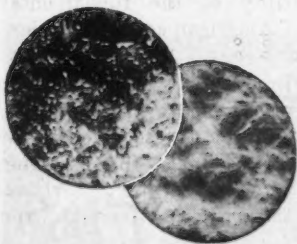
IF YOU USE COOLANTS

-Keep Them Clean

IT PAYS DIVIDENDS IN BETTER WORK
AND GREATER PRODUCTION!



MODEL Z-1-AR-S BRIGGS COOLANT FILTER. Capacity 3GPM. Unit models up to 100 GPM available. Specially designed filter cases contain cartridges of treated cellulose—constructed to remove particles as small as 1 micron (.00004"). This combination of a cartridge, capable of removing the smallest of foreign particles, with a case designed to assure perfect passage of the liquid through the cartridge, is the only method of providing effective coolant filtration.



UNRETOUCHED PHOTO at left shows dirt left on filter paper before filtration of coolant. At right is shown what happened after the coolant was passed through a Briggs Coolant Filter. Notice the complete absence of dirt on the filter paper.

One plant reports 11% production increase since Briggs Coolant Filters were installed

Extreme accuracy of tolerance and perfection in surface finish are obtainable only when the coolant is kept absolutely free from contaminants. By effective filtration such as provided by Briggs Coolant Filters these two desirable results can be obtained faster . . . and with fewer rejects. Wheels and tools will last longer. Work will be clean . . . easily gauged. The cause of dermatitis will be minimized. Coolant will last longer.

Briggs Coolant Filters are easily installed on any machine. Available for unit machines or for central systems. **THEY PAY FOR THEMSELVES!**

In this plant, Briggs Coolant Filters earned \$56.00 per grinder per 8-hour day.

Briggs

PIONEERS IN MODERN
OIL FILTRATION

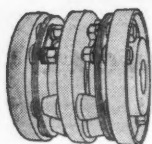


BRIGGS CLARIFIER COMPANY
GENERAL OFFICES, WASHINGTON 7, D. C.

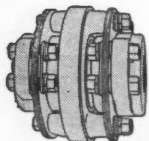
Consult the "Filter" section of your classified telephone directory to find the Briggs distributor in your locality or write manufacturer for complete information.

THOMAS

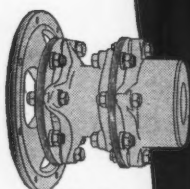
flexible **COUPLINGS**
FOR *any* SPEED OR SERVICE



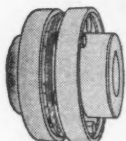
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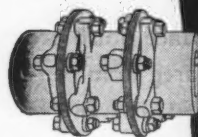
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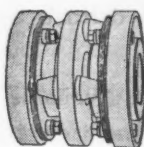
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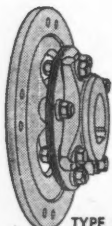
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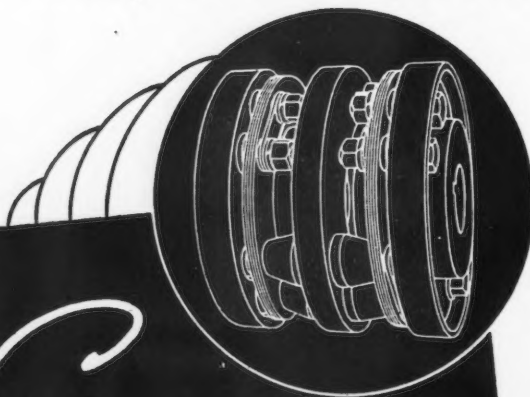
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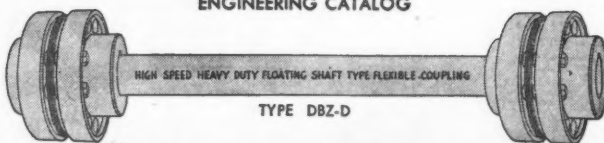


Eliminate
**BACKLASH, FRICTION,
WEAR AND CROSS-PULL**
.....the 4 destructive evils found in
all other types and makes of couplings.

**NO BACKLASH
NO WEAR
NO LUBRICATION
NO THRUST
FREE END FLOAT**

These are the five essential features of
Thomas Flexible Couplings that insure
a permanent care-free installation.

WRITE FOR COMPLETE
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**THE THOMAS PRINCIPLE ELIMINATES CHAINS,
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THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

NEWS OF INDUSTRY

ore is not many years distant. The zinc and lead of Oklahoma have almost run out. Our petroleum reserves, although not positively known, at present rates of use are variously estimated to last from 10 to 30 years. We are, to be sure, not yet impoverished, but whether underground supplies of many indispensable minerals last 5, 10 or 50 years, the fact remains that they are expendable, and we are expending them at furious rates."

The editor points out that our war experience with tin, rubber, manganese and other essential materials demonstrates that we cannot, as a nation, lead an isolated existence.

Expanding on his contention that the ability of the United States to out-produce by mass-production methods is disappearing, Mr. Scarlott says:

"Our ability to produce necessities and luxuries of good quality, at low cost, and of identical, interchangeable pattern in veritable floods is known around the globe. But in this skill we possess no permanent monopoly. Other peoples are learning our methods. It is no secret that mass-production methods are being adopted in many countries where only handcraft-production methods have prevailed. No doubt our industrialists will, for a long time at least, be able to produce in greater volume and quality than the less-experienced peoples. But, the great gulf of advantage possessed by a mass-production nation over handcraft peoples is due to diminish."

Actually, the third ingredient of our industrial strength is many things, Mr. Scarlott continues. It is technical skill, mechanical skill, research and imagination.

"This resource is not expendable," Mr. Scarlott points out. "Neither is it something we alone possess. But it is cumulative in roughly geometrical ratio; it is sharpened by competition. Furthermore, the stock of 'know how' already amassed is enormous. As if to substantiate this, there continues to pour forth, in war as in peace, a flood of new discoveries, newly clarified principles, new products and new machines. This uninterrupted flow of contributions by men of science and engineering gives concrete evidence of the virility of the fundamental strength of American society—leadership in technology.

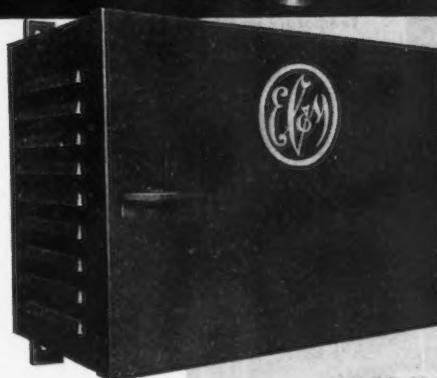
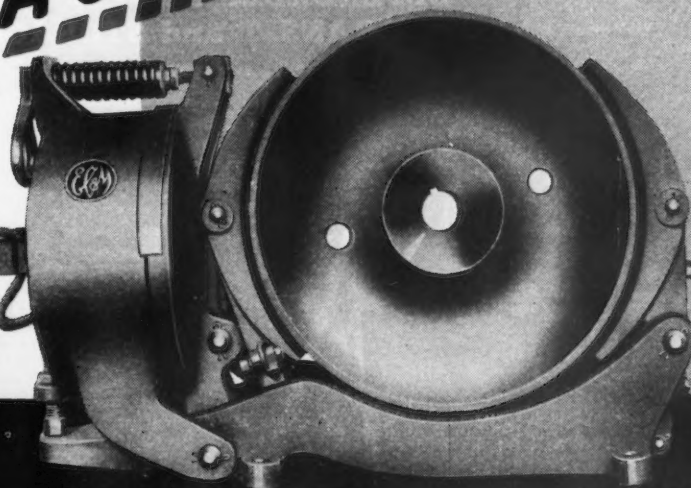
"These things give assurance that American pre-eminence will not suffer any blight in the foreseeable future and point to the need for spending larger sums and greater effort to augment this great American resource," he concludes.



TYPE WB BRAKE

Solves the A-C BRAKE Problem

.... gives better
PERFORMANCE
too...



Rectifier - Unit in
compact form for
separate mounting
on existing installa-
tions.

MANY users of a.c. motor-driven cranes, hoists and machinery are switching to the EC&M Type WB Brake with rectifier-unit. Its *high-speed performance* and *reduced up-keep* for a.c. circuits have prompted its nationwide acceptance. Repeat orders indicate standardization on the WB Brake wherever a.c. brakes are needed.

These brakes not only eliminate the laminated members required in a.c. brake design, but give quick response. High initial current insures *fast release*; automatic reduction of the holding current results in *fast setting*.

The rectifier-unit is compact and is arranged for separate mounting for existing installations. On new projects, it may be combined with the motor control panel. Bulletin 1006 gives complete details on WB Brakes for a.c. operation. Bulletin 1004-D describes them for d.c. service.

THE ELECTRIC CONTROLLER AND MANUFACTURING CO.

2698 East 79th Street

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REDUCED UP-KEEP and BETTER OPERATION

because

- No laminated magnets or plungers.
- No destructive hammer-blow.
- No a.c. chatter.
- No coil burn-out due to shoe-wear affecting air-gap.
- No motors, gears or pumps.
- Has fast release and fast set.
- Has ability to permit accurate inching.
- Has hand release.
- Has solid cast-steel magnet and armature.
- Has short armature-movement.
- Has thick, molded brake blocks $\frac{1}{4}$ " to $\frac{3}{4}$ " thick.

**On Cranes, Hoists and Machinery
...the EC&M Type WB Brakes**

give

HIGH SPEED PERFORMANCE

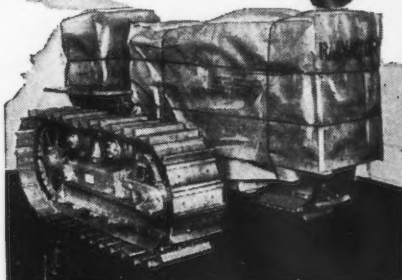
—REDUCED UP-KEEP



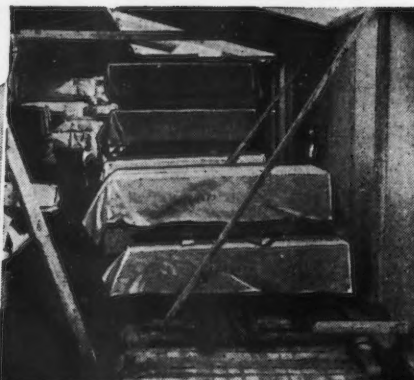
FIBREEN

SISAL-REINFORCED
WATERPROOF PAPER

**ASSURES
DEPENDABLE PROTECTION
in TRANSIT and STORAGE**



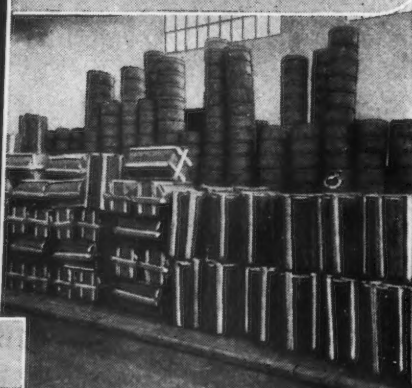
Fibreen keeps dirt and moisture from the motor of this powerful tractor.



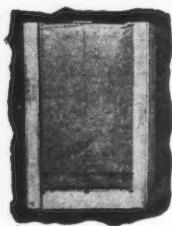
Temporary emergency storage shelters are made with Fibreen on 2"x4" frame.



Steel sheets wrapped with Fibreen are shipped safely in open cars.



Felt hats, wrapped with Fibreen, are protected from dirt and dampness.



Crates made with Fibreen often replace solid boxes, with resultant savings in packaging and shipping costs.

Send for a "working" sample of Fibreen. Our knowledge is at your service.

It's the All-Purpose Paper

Felt hats or tractors — sheet steel or hairpins — excess machinery in storage — goods shipped in open cars or in rolls, crates or cases — all are protected from moisture and dirt by *Fibreen*. Make sure that *your* products have dependable *Fibreen* protection — to assure safety while in storage and to prevent losses and complaints due to exposure in transit.

Keep a few rolls of *Fibreen* in your shipping room. It's pliable and tough!



THE SISALKRAFT CO.
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SISALTAPE AND COPPER ARMORED SISALKRAFT

Experience Indicates Strong French Steel Recuperative Power

New York

• • • The reconstruction era which followed World War I resulted in the enlargement and modernization of the iron and steel plants of France and the Low Countries, says the American Iron & Steel Institute. If history is repeated, after the present war in Europe there may be a similar expansion over the prewar capacity of about 18,000,000 net tons of steel per year in those countries.

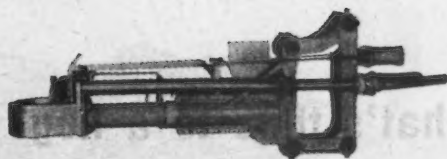
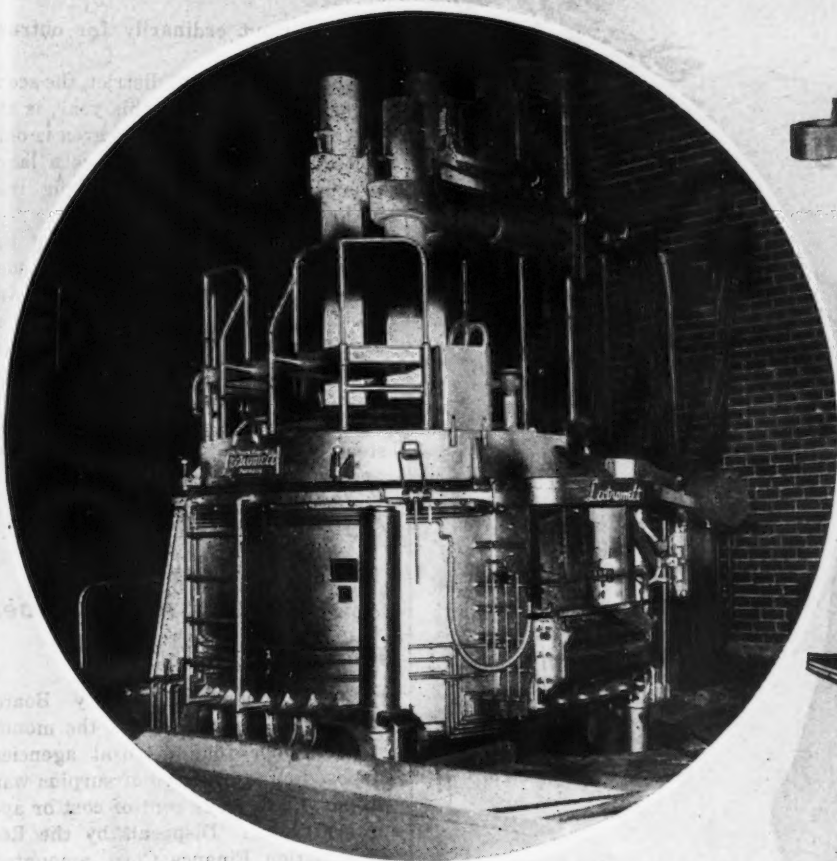
Restoration of the important iron and steel industries in Western Europe has been proposed to help speed reconstruction of the lands overrun by the Germans. France alone has been reported to need upwards of 8,000,000 tons of steel in its first post-war reconstruction year.

Meanwhile, during the balance of the war, some of the existing iron and steel production facilities in France may be in a position to contribute toward United Nations' munitions needs if coke can be obtained. Six weeks after Luxemburg was freed from the Nazis, and before the German counter-drive late in 1944, around 30 per cent of the iron and steel capacity of that small nation was producing for the benefit of the Allies. It was expected that the amount would increase with the receipt of more coke.

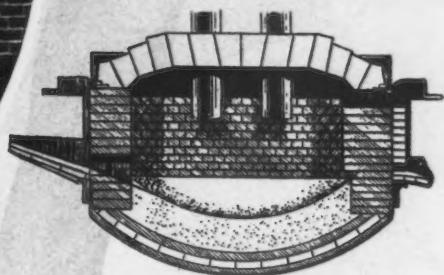
Subjugations and changes appear never to have permanently impaired the iron and steel industry from the Rhine to the English Channel. The plants of France proper, which produced around 5,000,000 net tons of steel in 1913 were turning out approximately the same amount per year by 1925 after declining to around 1,985,000 tons in 1918. The mills of Alsace-Lorraine, returned to France in 1919, added about 2,899,000 tons of production to the 1925 figure above.

Belgium's production of around 2,719,000 net tons of steel in 1913 dropped to 11,619 tons in 1918 following the severe damage inflicted on the industry in the first World War. But in 1925 Belgium produced 2,809,000 tons of steel. Luxemburg's 1925 production of 2,300,000 tons of steel was about 800,000 tons higher than the output of 1913.

France, Belgium and Luxemburg are normally important factors in world exports of iron and steel particularly the latter two countries



• Lectromelt composite electro-mechanical electrode arm with power operated clamp for gripping the electrodes and conducting the current from the secondary anti-skin effect cables to the electrodes. Another Lectromelt design feature is the electrode clamps, multi-part multi-contact water cooled type (Moore patent).

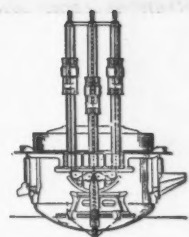
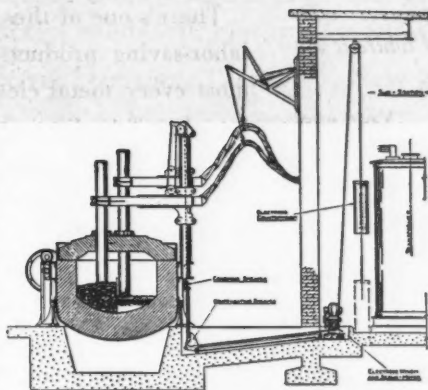


• Lectromelt's patented spheroidal furnace bottom keeps scrap moving down as melting progresses and permits heavy loads and more rapid melting. Lectromelt furnace bottoms are correlated to the angle of furnace tilt so as to insure complete drainage.

Designed for efficiency

★ This recently installed size 12 ton capacity Lectromelt top-charge furnace incorporates the exclusive Lectromelt design features, which assure efficient and economical production of quality steels and irons.

Practical for pouring both large and small heats, Lectromelt top-charge furnaces are available in sizes from 100 tons down to 250 pounds capacity. Details on request.



• The Moore patent, counterbalanced electrode arm winch system is used to operate the "floating" arms with minimum regulating power and to avoid breakage of electrodes. This improved system affords extremely sensitive regulation, so vital in making low carbon metals.

MOORE RAPID
Lectromelt
FURNACES



PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH 30, PA.

What's time to a hog?



They tell of a mountaineer who stood holding up a shoat while it ate persimmons from a tree.

A stranger came along. "You may get that hog fat after a while," he remarked, "but it'll take a long time."

"Hub," was the reply, "what's time to a hog?" *

* * *

There's no such leisure in finishing plants these busy days. Time is all-important there. So plant operators are *saving time* by turning to Wyandotte Metal Cleaners.

*From B. A. Botkin's, "A Treasury of American Folklore"

There's one of these specialized, labor-saving products to meet almost every metal cleaning need—for cleaning after machining and prior to plating, painting, lacquering, blackening, anodizing or spot welding.

The specialized help of the Wyandotte Field Engineers is yours for the asking too. Call him in to help you solve *your* particular problem and to help you prepare for future expansion.



Wyandotte

REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION

Wyandotte, Michigan • **SERVICEREPRESENTATIVES IN 88 CITIES**

J. B. Ford Division

where output ordinarily far outruns domestic needs.

Another important district, the scene of fierce battles early this year, is the Saar region. Although its area is only 750 square miles, the Saar is a large producer of coal and coke, pig iron and steel.

For 15 years after the end of the first World War the district was under the supervision of the League of Nations and within the French Customs area. Early in 1935 it was returned to Germany. The previous year, 1934, the Saar region produced 2,012,000 tons of pig iron and 2,150,000 tons of steel.

Agencies Dispose Of \$27,701,000 Surplus Property in December

Washington

• • • The Surplus Property Board recently announced that in the month of December four disposal agencies disposed of \$27,701,000 of surplus war property, at 59 per cent of cost or appraised value. Disposals by the Reconstruction Finance Corp. amounted to \$14,748,000 and brought 47 per cent of cost; the Procurement Division of the Treasury Department \$12,105,000 and 75.4 per cent of appraised value; the United States Maritime Commission \$754,000 and 42 per cent of cost, and War Food Administration \$94,000 and 27.7 per cent of cost. Included in this total were \$1,412,000 disposed of to other U. S. Government agencies and \$1,619,000 for lend-lease.

This rate of disposal compares with surplus war property acquired in December by these four agencies, together with Foreign Economic Administration and National Housing Agency, amounting to \$217,656,000.

Inventories of all six agencies on Dec. 31 amounted to \$1,041,711,000. Aircraft and related equipment accounted for \$704,149,000. Because of their heavy construction and high operating costs, many of the 22,786 planes which constitute the aircraft inventory will have virtually no commercial use.

In addition to the \$1,041,711,000 inventories held by the disposal agencies, almost another billion dollars of surplus is already in prospect. The War Department has been screening, to determine if it is surplus to its needs, excess property, contractor-owned termination inventories and idle plants and facilities totaling \$562,000,000. The Navy is screening \$91,000,000. Idle plant and facilities

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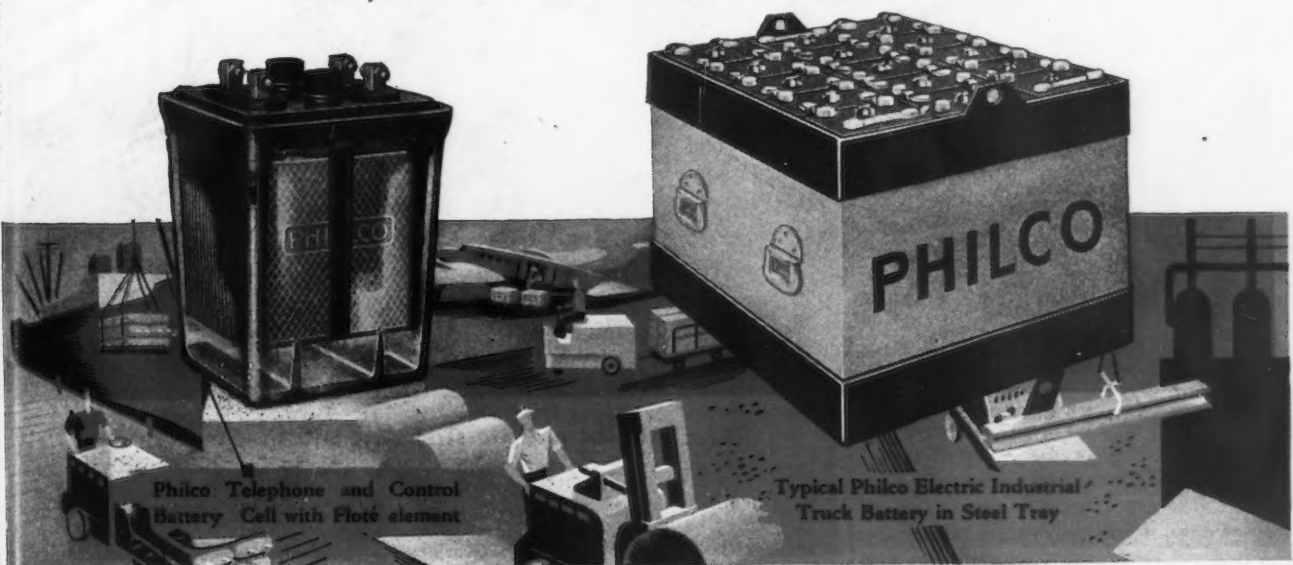


The new Philco "Thirty", with 30% longer life, is identified by its distinctive red top.

Consistently through the years, users of PHILCO Storage Batteries—both motive power and stationary types—have been *first* to get the major developments contributing to high capacity, greater efficiency, longer life, lower cost. Newest Philco *first* in industrial storage battery engineering is the new Philco "Thirty" with *30% longer life*—now available in certain types and limited quantities for electric industrial trucks. Catalogs of this and other modern Philco Batteries for your special needs will gladly be sent on request.

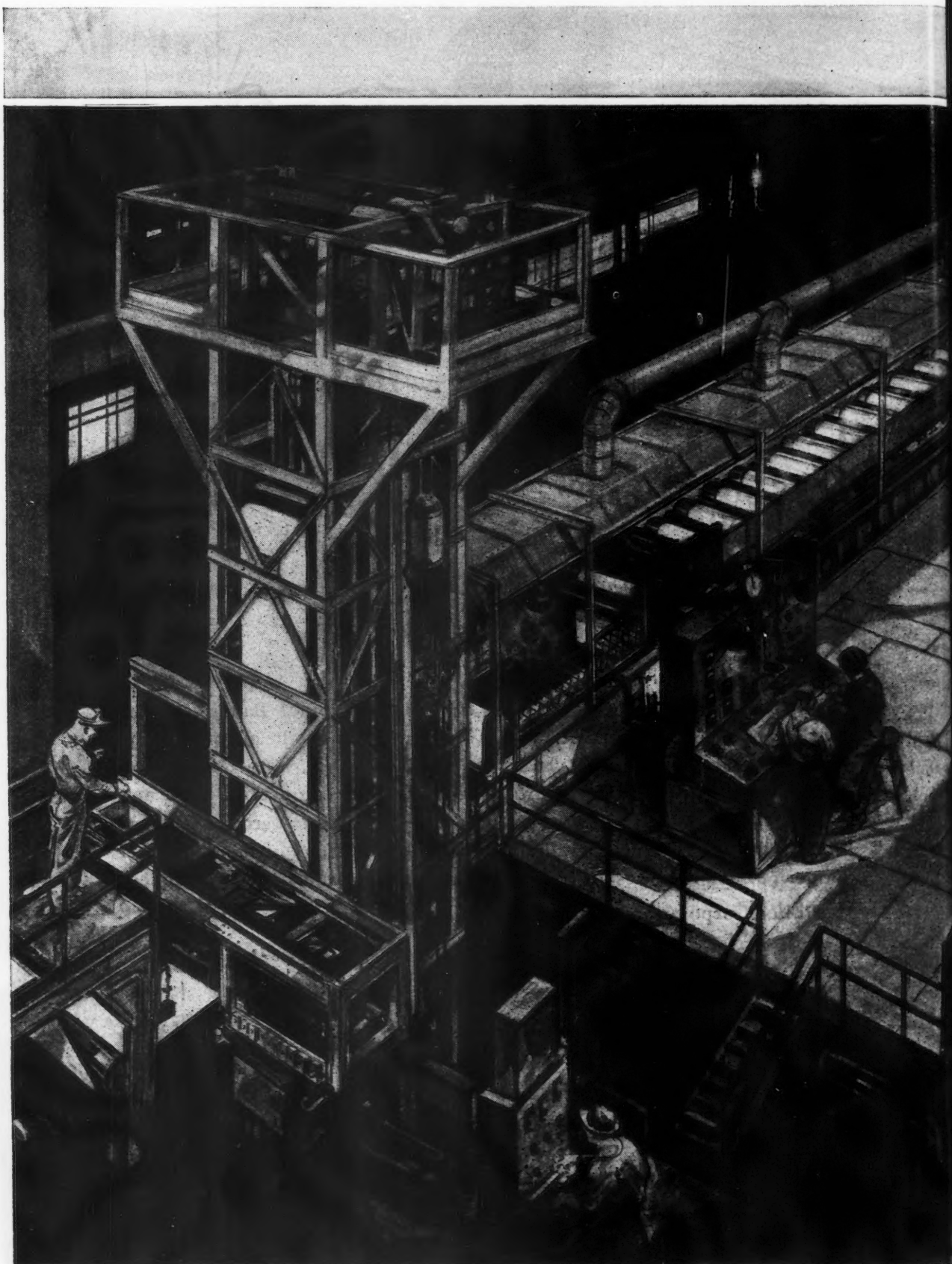
Philco Corporation, *Storage Battery Division*, Trenton 7, New Jersey

For 50 years a leader in Industrial Storage Battery Development



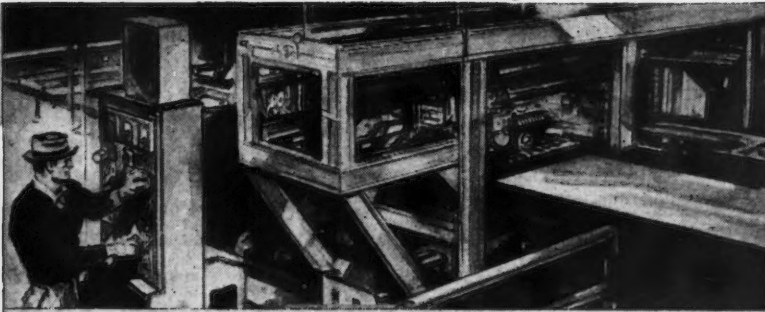
Philco Telephone and Control Battery Cell with Floté element

Typical Philco Electric Industrial Truck Battery in Steel Tray



Electrically plating steel strip with tin

FROM AN ORIGINAL DRAWING AND SKETCHES MADE AT J&L ALIQUIPPA WORKS BY ORISON MACPHERSON

*Steel strip entering electrolytic lines*

TINPLATING METHOD BORN OF THE WAR

Capture by the Japs of the tin mines in the Malay Straits Settlements forced rapid development of tinplating equipment to make what tin we had go farther, and still afford complete protection to foods, fruits and other products packed in tin cans—the best all around container.

The best method available proved to be the electrolytic tinning process. The steel industry with the cooperation of the can manufacturing and closure industries developed electrolytic tin-plating and units were installed all over the country.

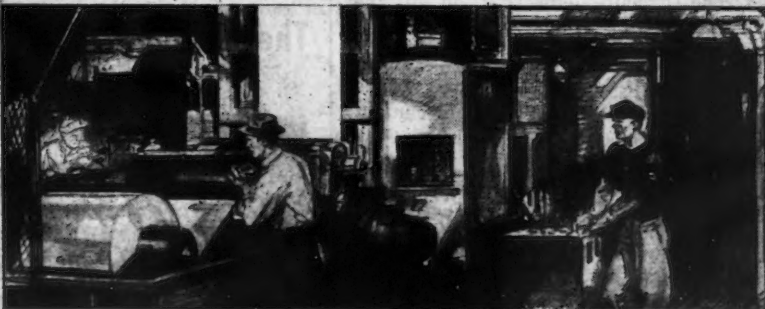
The new process electrically deposits tin upon continuously moving steel strip in rigidly controlled plating thicknesses, and does it speedily, evenly and thoroughly. It saves up to 67% of the tin required for tinplate, as compared with the hot-dip process. A war economy now, the new process promises good things when tinplate comes back in abundance for domestic use.

JONES & LAUGHLIN STEEL CORPORATION



PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEEL FOR WAR AND PEACE

Tinplate emerging from electrolytic unit

COPYRIGHT 1945 — JONES & LAUGHLIN STEEL CORPORATION

TIN CONTAINERS

Cans and fighting men are inseparable. The soldiers' principal reliance for food is upon the tin can. Special rations are packed in tins. The "provision bomb" is a tin container of food to be dropped to survivors at sea or surrounded soldiers. Gas masks, flares, Very pistols, bomb fuses, smoke signals in colors come in tin cans; so do ammunition, fuels, lubricants for tanks and planes, blood plasma, life-saving devices, drugs and dressings. So, while the family tin can for many products has taken a leave of absence, the production of cans for foods has been greater than normal—an estimated 250,000,000 cases of canned fruits and vegetables in 1944.

Minerals and vitamins are better protected and retained by modern canning methods than by the most commonly used home-cooking methods, due to modern canning practices that make use of procedures developed to protect vitamin and mineral content of food.

Food kept in open cans is just as safe as taking it out and putting it in a dish or bowl, if can is kept cool and covered, states a recent release of the U. S. Dept. of Agriculture. "Cans and foods are sterilized in the 'processing'," says the statement, "But the dish into which food might be emptied is far from sterile."

Discoloration inside cans is entirely harmless. It is caused only by the sulphur present in some foods, just as the sulphur in a cooked egg will discolor silverware.

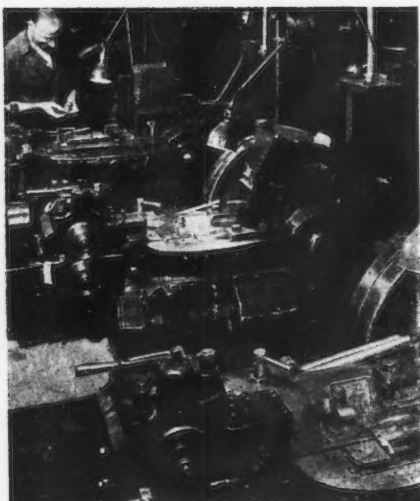
No preservatives in canning, since canned foods keep for years because they have been heat-processed in sealed containers.

Liquid in a can of vegetables is the juice in which the food is cooked in the can. Whenever possible, this liquid should be cooked back into the food or used for soups or sauces. It contains soluble food values such as certain minerals and vitamins extracted from the food.

Lithography on cans. The use of attractive design and brilliant color on tin containers for cakes, candies, confections and countless toilet and beauty preparations, will return after war more attractive than ever.

China invented sauerkraut, not Germany, according to an official of the American Kraut Packers Association, whose research revealed sauerkraut was fed to laborers on the Great Wall centuries ago to combat vitamin-shy diet. The American canned sauerkraut crop last year exceeded 3 million cases.

Home-canning jar tops are a product of the closure industry. Victory gardeners this season will use them by the millions. They will be made with electrolytic tinplate. Other tin closures are the familiar tops of bottles, cans and jars.



A section of our modern high-speed ball heading machine department.

What Price Peace!

Nearly everybody agrees wars cost too much and it takes too long to bring them to an end.

The billions of dollars—the days, months and years consumed in waging war is staggering. The manufacture of all the deadly implements of war. The gigantic job of transporting the men and materials to the various theatres of action. The painstaking care and correct timing of attack. To organize for a world-wide war is an enormous undertaking.

Costly, heart-breaking, time-consuming, yes. But no matter what the cost or how long it takes, America and her Allies must be victorious, unconditionally. Whenever you think about these costs in time and money ask yourself if, by caution and extra cost, the life of but one soldier is saved, and that soldier is your son ... is it worth it?

UNIVERSAL PRECISION BALLS

OF STEEL, BRONZE AND SPECIAL MATERIALS

PRODUCTS OF
VULCANITE PORTLAND CEMENT CO.
WILLOW GROVE, Montgomery County, Pa.

Established 1894

Telephone: Willow Grove 1200

NEWS OF INDUSTRY

held in standby condition by Defense Plant Corp., plants used as storage disposal centers, and plants for which operating agreements had been or were about to be terminated amounted to \$329,000,000.

In the seven months June 1 to Dec. 31, disposals by the six disposal agencies amounted to \$162,865,000. In addition, the reported cost of War Department direct disposals during that period amounted to \$280,880,000. War Department sales of scrap and salvage brought \$52,882,000. Of the \$22,652,000 sales made by the Navy direct, \$19,903,000 was scrap and salvage. The activities of the disposal agencies, plus those of the Army and Navy, thus bring total surplus property disposals by all Federal agencies to \$519,279,000 in the seven months to Dec. 31.

The Reconstruction Finance Corp. is the disposal agency for capital and producer goods, including plants, equipment, many types of raw materials and other industrial property, as well as aircraft and aircraft components. In the month of December, surplus property costing \$14,748,000 was disposed of by RFC for \$6,877,000, or 47 per cent of cost. Aircraft and related equipment accounted for \$4,547,000 and metal working machinery \$4,289,000.

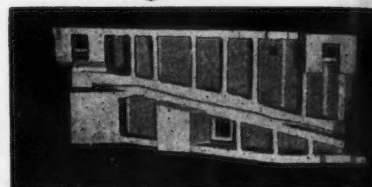
In the seven months, June 1 to Dec. 31, surplus property which cost \$80,621,000 brought \$48,528,000, or 60 per cent of the reported cost. These disposals constituted 8 per cent of the total declared surplus. Aircraft and related equipment accounted for \$17,943,000, metal working machinery \$16,870,000, construction materials \$9,976,000 and special industry, machinery \$4,246,000.

In the seven months to Dec. 31, RFC received declarations of surplus property, mainly from the War Department, of \$953,754,000, four times the amount received by all other disposal agencies and twelve times its own disposals.

The Procurement Division of the Treasury Department is the disposal agency for consumer goods. In the month of December, consumer goods brought \$9,144,000, or 75.4 per cent of the \$12,105,000 appraised value of property sold. Included in this total were goods sold to U. S. Government agencies, including FEA (Lend-Lease), which brought \$1,630,000 or 76 per cent of the \$2,145,000 appraised value. The December total also in-

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Die



Radiator
Shell
Die



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Vault
Die



Because Strenes Metal can be cast to shape—because it usually saves about one-half on machining time—because its self-lubricating properties make for long runs and infrequent re-dressings—

Because of these and still other advantages, most of our automotive firms, stove manufacturers, refrigerator builders and many more specify Strenes regularly for drawing and forming dies.

Get the facts. They should convince you. Write.

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Strenes METAL

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Contact **KAYDON** of Muskegon

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER



Few Attempt Such Manufacture

Typical of KAYDON'S successful specialization in difficult manufacture is this flat race ball thrust bearing 22.000" x 26.000" x 1.000". Races are only .3125" thick, held to .001" parallelism. Bearings are made 4" bore to 120" O. D.

As readily and economically as standard types and sizes are manufactured, KAYDON produces special bearings that banish the need for using "catalogued" bearings that fail to meet your exacting needs.

That is the *specialized* service, created by KAYDON to meet rigid wartime requirements of the U. S. Navy — available to industry as an economical means of product refinement. Atmospheric control in heat treating, rarely

provided by special bearing manufacturers, is available at KAYDON. In addition, KAYDON offers added services in flame hardening, precision heat treating, metallurgical laboratories, microscopy and physical testing.

Counsel in confidence with KAYDON. While vital wartime requirements have precedence, capacity for general production is constantly increasing. Look ahead — and plan ahead — with KAYDON!

KAYDON Types of Standard or Special Bearings:

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| Spherical Roller | • | Taper Roller |
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| Roller Radial | • | Roller Thrust |

THE KAYDON ENGINEERING CORP.
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New in Name . . . Old in Experience

ADECO NOZZLE TESTER

*Keeps Diesel Engines
Running Efficiently*



**TESTS FUEL INJECTORS
AND HYDRAULIC DEVICES
At Pressures Up To
10,000 p.s.i.**

To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

Light in weight yet built for heavy-duty service, it enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Tests both large and small injectors, on bench or engine, at pressures up to 10,000 p.s.i. Prevents costly delays and possible damage to engine.

Ideal for testing hydraulic devices.

Write for bulletin on this practical, low-cost unit.

**AIRCRAFT & DIESEL
EQUIPMENT CORP.**

4411 NO. RAVENSWOOD AVE.
CHICAGO 40, ILLINOIS

cluded \$1,504,000 to State and local governments and tax-supported institutions. Sales to all others, chiefly industry and commerce, brought \$6,010,000.

The disposal of automotive vehicles, the leading activity of the Procurement Division, has fallen off during the past two months, due to the fact that the Army is retaining supplies of vehicles that had been expected to be declared surplus. Disposals of motor vehicles in December were \$4,063,000, compared with \$4,741,000 in November and \$6,814,000 in October. Owing to the acute demand, the majority of motor vehicle sales have been at ceiling prices. Sales of waterproof garments, overcoats, uniforms and obsolete Army shoes have been active, much of it going to Lend-Lease.

Holds 2 to 3 Per Cent Absenteeism Is Normal

Chicago

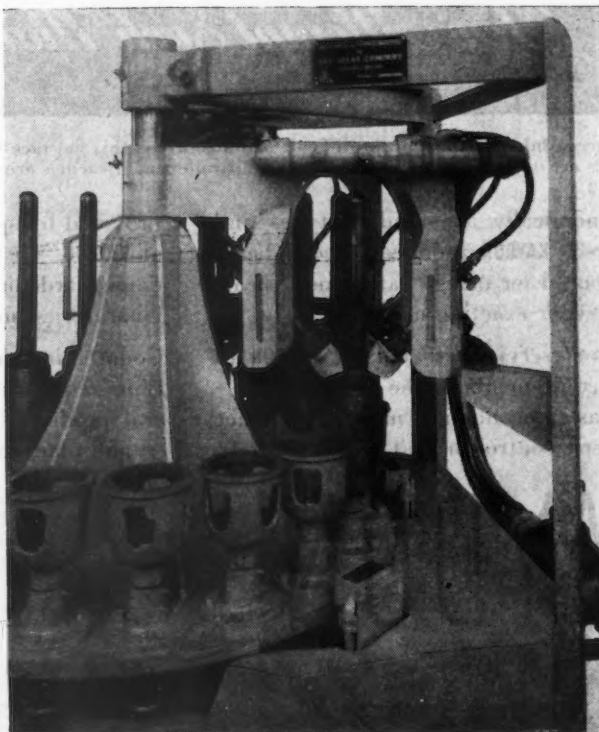
• • • From 1½ to 2 million man days per month are lost in Chicago area war plants because of absenteeism, according to the War Manpower Commission. Although the rate has dropped since the Christmas holidays, WMC estimates war workers in the Chicago industrial area were absent 2,145,000 days in December.

The Maritime Commission reported disposals of small vessels, marine engines and maritime equipment in December costing \$754,000 which brought \$317,000, or 42 per cent of cost. In the seven months June 1 to Dec. 31, property costing \$4,975,000 brought \$3,444,000 or 69 per cent.

War Food Administration's disposals of surplus food have been confined to that turned over to it by other owning agencies, principally the Army and Navy. On Dec. 31, only \$85,000 of such property, mainly canned foods, remained in its surplus inventory. During the month of December, sales of food costing \$94,000 were made for \$26,000, or 27.7 per cent of cost. In the seven months to Dec. 31, total sales of food costing \$238,000 brought \$144,000 or 61 per cent of cost.

In 27 major plants rated critical, the absentee rate was 7.5 per cent, rising from 5.6 per cent in October. WMC believes that a proper goal is two to three per cent.

Among the lowest absentee rates during the month—2.8 per cent—was a foundry which follows a policy of discharging chronic absentees. The firm employs a nurse who regularly visits each absentee, and maintains a wage incentive system. Most of the employees have worked for the firm for many years.



**ROCKET SHELL
BRAZING:**
Here an automatic Selas machine is shown brazing the tube to the forged head of the rocket shell. Each cup of the machine takes a forged head and steel tube, along with brazing flux and ring of brazing alloy. As the assembly turns it is indexed between refractory burners where the temperature is localized to the brazing zone.

M. A. Hanna Co.'s Net Income Down Slightly

Cleveland

• • • The M. A. Hanna Co., coal, ore, stock and vessel operators, reports net profit of \$4,122,287 for 1944 after all expenses and taxes, including federal income taxes of \$1,687,761. The profit is equal after preferred dividends to \$3.51 a share on common, and compares with \$4,341,200, or \$3.64 a common share, in 1943.

Anthracite tonnage of the Hanna Co. was 3,427,000 tons in 1944 as compared with 3,303,000 tons in 1943. Bituminous production was 5,883,000 tons in 1944 as compared with 5,393,000 tons in 1943, and total bituminous tonnage, including coal handled as agent or lake forwarder, was 17,193,000 tons in 1944 as compared with 16,548,000 tons in 1943. Iron ore handled was 7,207,000 tons as compared with 7,545,000 tons in 1943.

Work of opening the Iron Mountain mine in Missouri and constructing the concentration plant and surface layout was started last March and the first shipments of ore to the furnaces in St. Louis were made in November 1944.

Listed securities owned by The M. A. Hanna Co. at the year-end showed no changes from the preceding year. They include National Steel Corp., 591,937 shares; Industrial Rayon Corp., 131,000 shares; Standard Oil Co. (N. J.), 80,000 shares; Seaboard Oil Co. of Delaware, 50,000 shares; Pittsburgh Coke & Chemical Co., 115,827 shares; Phelps Dodge Corp., 40,000 shares, and Consolidated Natural Gas Co., 8000 shares.

Colonel Hirsch Appointed

Washington

• • • Col. Maurice Hirsch has been appointed by the Secretary of War as the War Department representative of the War Contracts Price Adjustment Board and has been elected its chairman. Colonel Hirsch, who is chairman of the War Department Price Adjustment Board and director of the Renegotiation Division, Army Service Forces, succeeds Brig. Gen. Albert J. Browning, Assistant Director of Materiel, Army Service Forces, as member and chairman of the War Contracts Price Adjustment Board.

Prior to his connection with the War Department in 1942, Colonel Hirsch engaged in the practice of law in Houston, Tex., where he was also active in many business and civic enterprises.



A helical-type driven gear on the main spindle of the Gisbort Simplimatic — famous high-speed, high-production automatic lathe — is made of Ampco Metal.

Protection against costly metal failures:

Machine tool parts of wear-resisting
AMPCO METAL

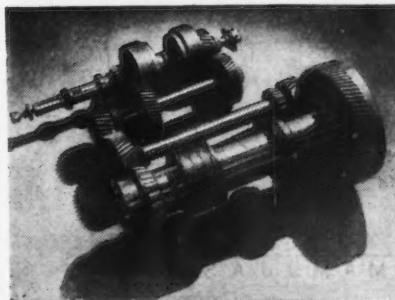
provide controlled hardness; high tensile strength; stubborn resistance to wear, impact, fatigue

Leading machine tool builders (over 90 of them) protect you against breakdowns at vital frictional points by using parts of Ampco Metal — a series of aluminum bronze alloys tailor-made to severe operating requirements.

The controlled physical properties — varying from ductile and soft to rigid and hard, but having in common two prime characteristics:



Below: Close-up of the Gisbort Simplimatic headstock transmission showing the helical-type driven gear (large one) made of Ampco Metal.



high strength and unsurpassed resistance to wear — give Ampco Metal several times the life of ordinary bronzes.

Check for parts of Ampco Metal, as a mark of quality in the machines you buy. And replace worn parts of your older machines with durable Ampco.

Send for "File 41 — Engineering Data Sheets." Use the coupon below.

Tear out and mail today!

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Dept. 1A-3, Milwaukee 4, Wisconsin

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MACHINE TOOLS

... News and Market Activities

Tool Men See Five Year Order Volume; Larger Than Pre-D-Day

Cleveland

• • • Today, as a part of an apparently inescapable concomitant of well-planned war, machine tool builders have found themselves with \$274,369,052 in unfilled firm orders, comprising more than 50,000 units or about five years' normal production, still before them.

This situation, after three years of tremendous production for war, would seem to suggest three things—that much materiel for use against the Japs is being ordered long before it will be needed, or, that Germany is

not going to throw in the towel for some time yet, or, that we are going to reconvert very little when the war in Europe ends. Any or all of these may be erroneous, of course, but one thing is certain—our armies are carving out Germany's industrial heart.

In this regard, it is interesting to note that one year ago, when oft predicted D-Day was still months in the future, the machine tool industry's backlog was a mere \$157,000,000 or about 33,000 units. Events last June 6 indicated that we were thoroughly prepared for invasion, but now, with

victory in Europe almost in our grasp, machine tool builders have a backlog more than a hundred million dollars greater than they had before our ground forces began to fight in France.

Current munitions programs require more machine tools than the industry can get out. There is a shortage of castings, and always the matter of manpower. Men are being drafted, preventing companies from building up employment and since last July, the industry as a whole has had around the same number of employees. Statistics released by the War Production Board recently showed that from December, 1944, to January, 1945, employment in the industry increased 0.9 per cent, totaling 56,500 wage earners. Part of this increase was attributed to the transfer of workers from other war contracts to machine tool production in the same plants. But notwithstanding, these companies now employ 25.3 per cent less wage earners on machine tool production than in January, 1944, when their employment stood at 75,600 workers.

Not long ago, the French, who have been given a big credit of two and one-half billion dollars, wanted to buy 1600 machine tools and were refused the priority. One executive here was openly critical of the government's policy toward France, since the French would be glad to go to work for the Allied cause, solving at the same time a somewhat difficult domestic situation for themselves.

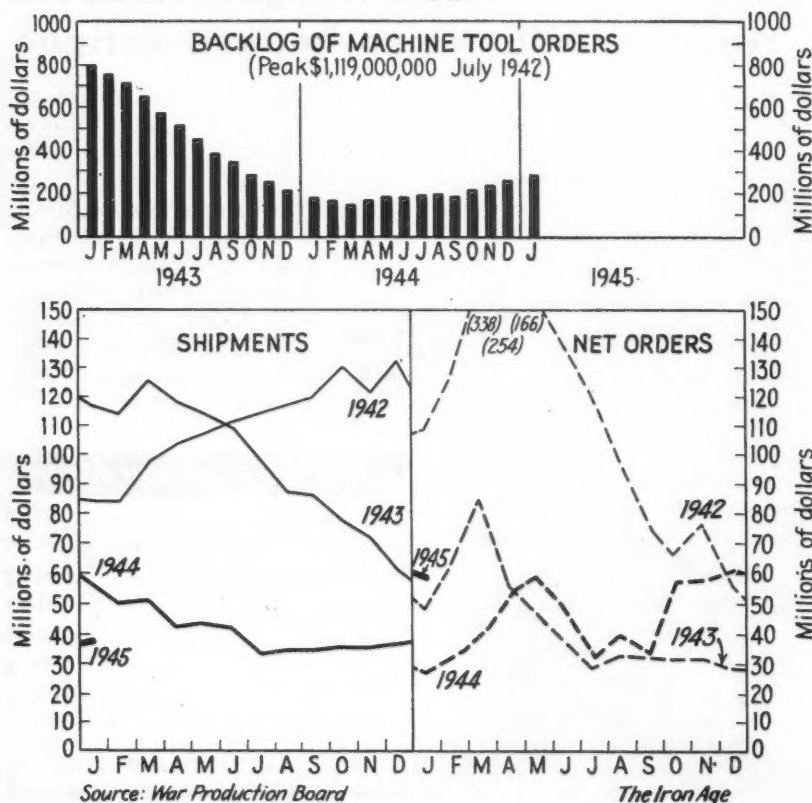
There was little in the current Government surplus, now estimated at 25,000 machines, to interest the French. Most of these machines, now reposing in DPC warehouses, have been discarded by contractors because, according to reports, they were no good but were used at the start of the war when manufacturers were putting anything and everything to work. Also, prices on them are reported to be high.

Some machinery is already stored in one of the two depots set up here by the Reconstruction Finance Corp. One of the depots, now in operation, consists of a warehouse with about 10,000 sq. ft. of floor space and an additional 12 acres of land for prefabricated shelters or open air storage.

• Reflecting an increase of 1.9 per cent over December, 1944, valuations, shipments of machine tools in January by 199 firms amounted to \$37,498,000, according to preliminary figures reported to the WPB Tools Division. New net orders decreased \$3,546,000 or 5.7 per cent under December figures of \$62,504,000 to \$58,958,000.

Unfilled orders, including export and unrated orders, continued their increase to a backlog valued at \$282,233,000. This is 8.2 per cent higher than December, 1944, valuations of \$260,880,000. Rated unfilled orders now total \$187,000,000, Tools Division officials said. Between seven and eight months will be required to fill all orders on hand Jan. 31, at the current rate of shipments, they added.

Employment by the reporting companies was 25.3 per cent less than in January, 1944, when 75,600 persons were engaged.



The JIGMIL has proven to be a totally new approach to the problems of economical precision BORING and milling of tool and production work

THE fastest producing and most accurate machine in the field.

Many users are reporting consistent experience of two to three times the output and higher quality work.

Automatic positioning of spindle from one location to another in response to measuring rods and push buttons to within less than .0001 (one ten-thousandth part of an inch).

Feather touch, pressure controlled slide locks that positively control locking uniformity, so essential to high precision work.

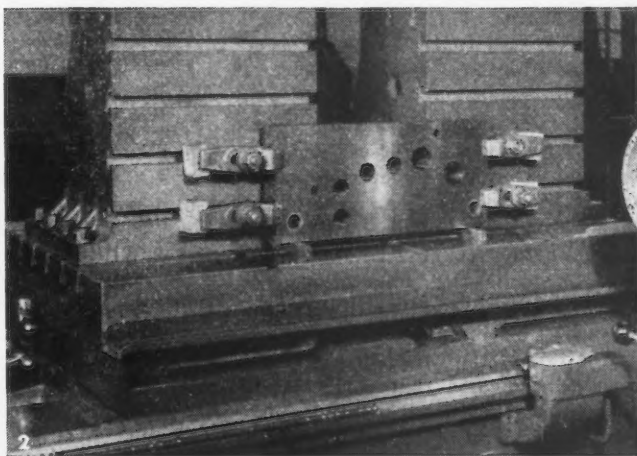
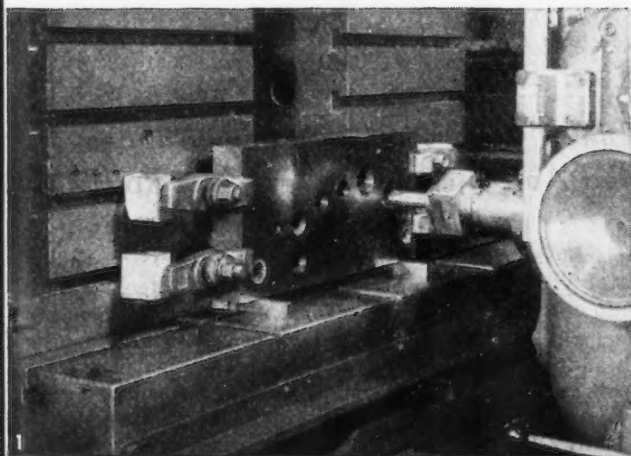
Unique operation and controls that make possible high precision work with relatively little skill.

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JIGMIL—The world's finest BORING and milling machine is made in Detroit.

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★ No. 1—Illustration showing convenience of jig plate boring. No. 2—Eight holes precision bored. Holes spaced within .0001 with total dependence of all spacing on automatic positioning means.

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NON-FERROUS METALS

... News and Market Activities

Brass Mill Expansion Ready in September

Cleveland

• • • Productive capacity at the Euclid Case plant of the Chase Brass & Copper Co. will be raised about 33 per cent by the construction of a \$9,800,000 addition, plans for which were announced this week by the Defense Plant Corp.

According to Wallace C. Husted, vice president of the brass fabricating company, the construction program will begin immediately and the addition is expected to be completed and in operation by September and will necessitate the hiring of 800 to 1000 more workers for production of brass strip, small arms cups, artillery cartridge cases and mortar shells.

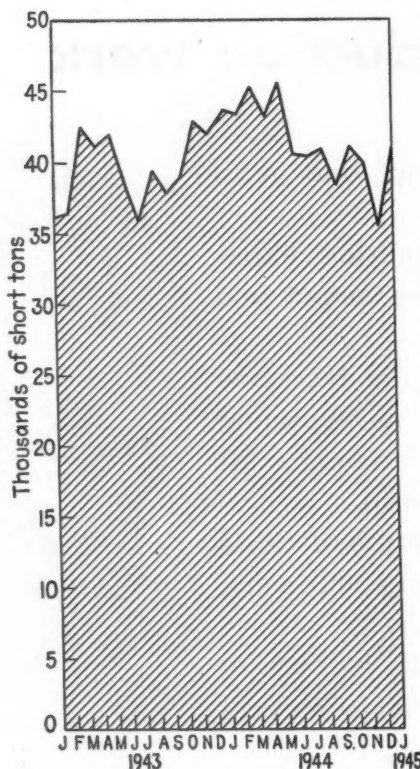
Air Corps Test Finds Salvage May Not Pay

Wright Field, Ohio

• • • A test disassembly of a "war weary" aircraft, carried out at Wright Field, Dayton, indicates the possibility that actual disassembly may cost more than the salable parts or the metal scrap. This conclusion, still tentative, was reached after a careful case study of a disassembled B-24 Liberator bomber.

This aircraft, which served approximately five months overseas and seven months in anti-submarine patrol duties required 782 hr. 51 min. of labor to remove component parts, while another 162 hr. 26 min. were used up in disassembling those parts which required additional work for salvage.

Analysis of the various components involved indicates that scrap metal and material obtained included somewhere over eight tons of aluminum, one ton of steel, one ton of rubber, and more than two tons of miscellaneous and mixed metals. Obviously the recovery cost of the scrap metal in the open market was very small. Some additional recovery would be possible on instrument and navigation equipment, but it was considered questionable whether such recovery would balance the cost of approximately 945 man hr. of labor.



INGOT SHIPMENTS: Brass and bronze ingot shipments for January have increased 5,508 tons over the December low. By way of comparison, copper deliveries were high in December and dropped off in January. Statistics prepared by the Defense Council of the Ingot Brass and Bronze Industry.

Zinc Will Again Be Allocated April 1

Washington

• • • WPB has again placed slab zinc under allocation controls, effective April 1, by amendment to order M-11.

All zinc from producers will be allocated by WPB's Tin-Lead-Zinc Division on the basis of applications submitted on form 2893. Applications should be filed before March 12, for shipments prior to April 30. Exporters are included under the amendment.

Consumers without allocation certificates may accept deliveries of less than 20 tons per month from dealers if the consumer has not applied to WPB for an allocation of zinc for the month concerned. Division officials said that preference ratings do not apply on purchase orders supported by allocations.

Bolivian Tin Prices Raised by Agreement

Washington

• • • Made retroactive to Dec. 19, 1944, and to continue until the basic agreement expires on June 30, 1945, Foreign Economic Administrator Leo T. Crowley has announced that the price to be paid for Bolivian tin has been increased from 60c. to 63½c. per lb. This change in the price is provided by an amendment to the contract, which has been in force since 1940. It was also agreed to increase the price 2c. a lb. retroactively from July 1 to Dec. 18, 1944. The amendment, under discussion since early 1944, was signed by representatives of the Bolivian producers, the Government of Bolivia and the United States Commercial Co., purchasing agency of the United States.

In announcing the price increase, Mr. Crowley said that provision was made for a new schedule of smelter charges designed to lend encouragement to the production of higher grades ores and concentrates. It is also designed, he said, to encourage maximum production of Bolivian tin ores for treatment at the government smelter at Texas City, Texas, and takes into consideration increases in wages and production costs.

Phelps Dodge to Open New Brass Rod Mill

New York

• • • A new \$6 million brass rod mill, to be equipped by the Defense Plant Corp. will be operated at Hammond, Ind., by the Phelps Dodge Copper Products Corp. The mill, having a capacity of 20 million lb. monthly, will be installed in former building No. 10 of the Pullman-Standard Car Mfg. Co. Shipping, storage and yard facilities will total about 52 acres and operations are expected to begin in May, with full production by August.

Other DPC contracts now under way by this company include an expansion of wire making facilities at the Habirshaw Division plant at Yonkers, N. Y., and an addition to the plant at its Los Angeles Tube Division.

NONFERROUS METALS PRICES

Primary Metals

(Cents per lb., unless otherwise noted)

| | |
|---|----------------------|
| Aluminum, 99+%, del'd (Min. 10,000 lb.) | 15.00 |
| Antimony, American, Laredo, Tex. | 14.50 |
| Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be | \$17.00 |
| Cadmium, del'd | 90.00 |
| Cobalt, 97-99% (per lb.) | \$1.50 to \$1.57 |
| Copper, electro, Conn. valley | 12.00 |
| Copper, electro, New York | 11.75 |
| Copper, lake | 12.00 |
| Gold, U. S. Treas., dollars per oz. | \$35.00 |
| Indium, 99.5%, dollars per troy oz. | \$4.50 |
| Iridium, dollars per troy oz. | \$120.00 |
| Lead, St. Louis | 6.35 |
| Lead, New York | 6.50 |
| Magnesium, 99.9+%, carlots | 20.50 |
| Magnesium, 12-in. sticks, carlots | 27.50 |
| Mercury, dollars per 76-lb. flask, f.o.b. New York | \$165.00 to \$168.00 |
| Nickel, electro | 35.00 |
| Palladium, dollars per troy oz. | \$24.00 |
| Platinum, dollars per oz. | \$35.00 |
| Silver, open market, New York, cents per oz. | 44.75 |
| Tin, Straits, New York | 52.00 |
| Zinc, East St. Louis | 8.25 |
| Zinc, New York | 8.65 |

Remelted Metals

(Cents per lb., unless otherwise noted)

| | |
|---|----------------|
| Aluminum, No. 12 Fdy. (No. 2) 9.00 to 10.00 | |
| Aluminum, deoxidizing No. 2, 3, 4 | \$6.00 to 9.50 |
| Brass Ingot | |
| 85-5-5 (No. 115) | 13.25 |
| 88-10-2 (No. 215) | 16.75 |
| 80-10-10 (No. 305) | 16.00 |
| No. 1 Yellow (No. 405) | 10.25 |

Copper, Copper Base Alloys

(Mill base, cents per lb.)

| | Extruded Shapes | Rods | Sheets |
|-------------------------------------|-----------------|-------|--------|
| Copper | 20.37 | 20.37 | |
| Copper, H.R. | 17.37 | 17.37 | |
| Copper drawn | 18.37 | | |
| Low brass, 80% | 20.40 | 20.15 | |
| High brass | | 19.48 | |
| Red brass, 85% | 20.61 | 20.36 | |
| Naval brass | 20.37 | 19.12 | 24.50 |
| Brass, free cut | 15.01 | | |
| Commercial bronze, 90% | | 21.32 | 21.07 |
| Commercial bronze, 95% | | 21.53 | 21.28 |
| Manganese bronze | 24.00 | | 28.00 |
| Phos. bronze, A, B, 5% | | 36.50 | 36.25 |
| Muntz metal | 20.12 | 18.37 | 22.75 |
| Everdur, Herculey, Olympic or equal | | 25.50 | 26.00 |
| Nickel silver, 5% | | 28.75 | 26.50 |
| Architect bronze | 19.12 | | |

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.137 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

| | |
|---|-------|
| No. 1 wire, No. 1 heavy copper | 9.75 |
| No. 1 tinned copper wire, No. 1 tinned heavy copper | 9.75 |
| No. 2 wire, mixed heavy copper | 8.75 |
| Copper tuyeres | 8.75 |
| Light copper | 7.75 |
| Copper borings | 9.75 |
| No. 2 copper borings | 8.75 |
| Lead covered copper wire, cable | 6.00* |
| Lead covered telephone, power cable | 6.04 |
| Insulated copper | 5.10* |

OPA Group 2†

| | |
|------------------------------------|--------|
| Bell metal | 15.50 |
| High grade bronze gears | 13.25 |
| High grade bronze solids | 11.50* |
| Low lead bronze borings | 11.50* |
| Babbitt lined brass bushings | 13.00 |
| High lead bronze solids | 10.00* |
| High lead bronze borings | 10.00* |
| Red trolley wheels | 10.75 |
| Tinny (phosphor bronze) borings | 10.50 |
| Tinny (phosphor bronze) solids | 10.50 |
| Copper-nickel solids and borings | 9.25 |
| Bronze paper mill wire cloth | 9.50 |
| Aluminum bronze solids | 9.00 |
| Soft red brass (No. 1 composition) | 9.00 |
| Soft red brass borings (No. 1) | 9.00 |
| Gilding metal turnings | 8.50 |
| Contaminated gilded metal solids | 8.50 |
| Unlined standard red car boxes | 8.25 |
| Lined standard red car boxes | 7.75 |
| Cocks and faucets | 7.75 |
| Mixed brass screens | 7.75 |
| Red brass breakage | 7.50 |
| Old nickel silver solids, borings | 6.25 |
| Copper lead solids, borings | 6.25 |
| Yellow brass castings | 6.25 |
| Automobile radiators | 7.00 |
| Zincy bronze borings | 8.00 |
| Zincy bronze solids | 8.00 |

OPA Group 3†

| | |
|-------------------------------------|-------|
| Fired rifle shells | 8.25 |
| Brass pipe | 7.50 |
| Old rolled brass | 7.00 |
| Admiralty condenser tubes | 7.50 |
| Muntz metal condenser tubes | 7.00 |
| Plated brass sheet, pipe reflectors | 6.50 |
| Manganese bronze solids | 7.35¹ |
| Manganese bronze solids | 6.25² |
| Manganese bronze borings | 6.50¹ |
| Manganese bronze borings | 5.50² |

OPA Group 4†

| | |
|----------------|-------|
| Refinery brass | 4.75* |
|----------------|-------|

*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. ‡Lead content 0.41 to 1.00 per cent.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

Other Copper Alloys

| | |
|-------------------------------------|-------|
| Briquetted Cartridge Brass Turnings | 8.625 |
| Cartridge Brass Turnings, Loose | 7.875 |
| Loose Yellow Brass Trimmings | 7.875 |

Aluminum

Plant scrap, segregated

| | |
|--|------|
| 2S solids | 8.00 |
| Dural alloys, solids 14, 17, 18, 24S | |
| 25S | 5.00 |
| turnings, dry basis | 3.25 |
| Low copper alloys 51, 52, 61, 63S solids | 7.50 |
| turnings, dry basis | 6.00 |

Plant scrap, mixed

| | |
|---------------------|------|
| Solids | 4.00 |
| Turnings, dry basis | 3.00 |

Obsolete scrap

| | |
|---------------------------|------|
| Pure cable | 8.00 |
| Old sheet and utensils | 6.00 |
| Old castings and forgings | 5.00 |
| Pistons, free of struts | 5.00 |
| Pistons, with struts | 3.00 |
| Old alloy sheet | 5.00 |

Magnesium*

Segregated plant scrap

| | |
|---|------|
| Pure solids and all other solids, exempt Borings and turnings | 1.50 |
|---|------|

Mixed, contaminated plant scrap

| | |
|------------------------------|------|
| Grade 1 solids | 3.00 |
| Grade 1 borings and turnings | 2.00 |
| Grade 2 solids | 2.00 |
| Grade 2 borings and turnings | 1.00 |

*Nominal.

Zinc

| | |
|---------------------------------|------|
| New zinc clippings, trimmings | 6.50 |
| Engravers, lithographers plates | 6.50 |
| Old zinc scrap | 4.75 |
| Unswaged zinc dross | 5.00 |
| Die cast slab | 4.50 |
| New die cast scrap | 4.45 |
| Radiator grilles, old and new | 3.50 |
| Old die cast scrap | 3.00 |

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

| | |
|--|-----|
| Copper: Cast, elliptical, 15 in. and longer | 25½ |
| Electrolytic, full size | 22½ |
| cut to size | 30½ |
| Roller, oval, straight, 15 in. and longer | 23½ |
| Curved | 24½ |
| Brass Cast, 82-20, elliptical, 15 in. and longer | 23½ |
| Zinc: Cast, 99.99, 16 in. and over | 16½ |
| Nickel: 99% plus, cast | 47 |
| Roller, depolarized | 48 |
| Silver: Roller, 999 fine per Troy (1-0) oz., per oz. | 58 |

Chemicals

(Cents per lb., delivery from New York)

| | |
|--|--------------|
| Copper cyanide, tech., 100-lb. bbls. 1-5 | 5.65 |
| Copper sulphate, 99.5 crystals, bbls. | 13.00-13.50 |
| Nickel salts, single, 425-lb. bbls. | 34.00 |
| Silver cyanide, 100 oz. lots | 40.82-41.125 |
| Sodium cyanide, 96% dom., 100-lb. dms. | 0.15 |
| Zinc, cyanide, 100-lb. dms. | 33.00 |
| Zinc, sulphate, 38% crystals, bbls. | 6.80 |

Labor Is Biggest Scrap Problem

New York

• • • Labor continues to constitute the most difficult problem facing the scrap industry in providing scrap supplies for mill and foundry production. There is no ready answer to be seen for this problem in the near future, hence prices of all grades except blast furnaces may be expected to remain at ceilings for the time being at least.

The recent WPB order limiting inventories of cast scrap to a 60-day supply is considered by the trade to be somewhat pointless, for foundry scrap has long been in short supply and it is believed few if any foundries have built up as much as re-

transactions. Shipments of short turnings for open hearths are being made somewhat above going quotations, but rejections are tempering shipments at higher than local prices for outside markets. Against this somewhat better aspect to the turnings market, a large local user is obtaining shipments at modestly lower prices—which accounts for the larger spread in current quotations.

BOSTON—Inability to secure equipment to load is holding up business. Some shippers have waited two weeks for cars. Congestion at freight terminal points is not as acute as a week ago, but still bad. Army need for equipment is unabated. Turnings are still weak due to lack of demand and accumulations, but not actually lower. Few foundries have the prescribed 60-day supply on hand and are hungry for cast.

BUFFALO—Scattered sales of machine shop turnings labeled "distress" material have been made here at \$13 to \$13.50 a ton, marking the first crack in ceilings since the market regained the full top early in January. So far the weakness has not extended to better grades and strong resistance to lower prices is noted among dealers in spite of the obviously sloppy condition of the turnings section. However, ferroalloy concerns at Niagara Falls recently have been paying the OPA maximum for short shoveling. Stockpiles of open hearth scrap vary considerably, although none is anywhere near the size as at this time last year. Consequently mill demand for heavier grades is expected to continue strong for the next few months, unless production schedules are upset by cancellation of war orders.

ST. LOUIS—Bad weather and a shortage of labor again retarded the movement of scrap iron to the St. Louis industrial district, and mills again report that consumption exceeds receipts. Maritime and railroad scrap is still being allocated to mills. The only thing plentiful is borings and turnings, for which there is no demand in this market and prices again are off.

CLEVELAND—There is a thoroughly good percentage of scrap moving out of town and some dealers say the market for almost every alloy grade but one, even the unpopular alloy grades, has come into its own. Alloy turnings with more than one per cent nickel or any alloy scrap with more than one per cent nickel is tough to get rid of, but the rest of it is moving fast. The open hearth situation is worse than it has been at any time since the war. You can't get anything—cars, labor, etc. Some mills are combating this by buying unprepared scrap, and there are more turnings being produced than can be consumed here.

PHILADELPHIA—There has been little change in the scrap market here this

week. Shipments are slightly improved but mills are still working on a day-to-day basis, or practically so. Even turnings seem to be in greater demand as mills have complained that shipment quotas on those grades have not been met.

NEW YORK—Movement of scrap is improving gradually in this area, aided by milder weather and easing of the freight car situation. If it were not for the shortage of labor in the yards, preparation of scrap and shipment could go forward adequately to relieve the problem of mill shortages. Dealers in this area are wondering whether any foundries have as much as a 60-day supply of cast scrap which represents the inventory limitation established by Direction 2 to Order M-24. Importation of battlefield scrap, which was abandoned by the Army some months ago in order to expedite turn-around of vessels, has not been renewed in substantial quantities according to dealers here.

BIRMINGHAM—Prices are still holding firm in this area although little demand exists for foundry and electric furnace grades. Both scrap collection and preparation has been hampered by rainy weather.

CHICAGO—Local market conditions quiet with most prices unchanged. The lower limit of weakness of blast furnace grades appears to be determined by prices obtained on out-of-district shipments, local orders being absent up to this time. Prices quoted on bundles, including both galvanized and machine shop turnings, have been confirmed by mill sales. Mill inventories are comfortable and widespread buying does not appear imminent in any grade.

Better Labor Ratings Won't Solve Problem

Boston

• • • The scrap trade here is engrossed with Institute and WMC labor questionnaires, which generally are not taken seriously. The trade is of the opinion that higher labor ratings for yard workers, as suggested by the WMC, is not the answer. They say they can pay labor so much and no more; that free labor seeks employment where the pay is higher; that higher ratings will not solve the problem. Labor for yards could be drafted, but drafted labor would be worse than no labor they say.

The trade also displays little enthusiasm over revived importation of battlefield scrap talk. Few have the necessary labor to prepare such scrap and have no intention of piling up unprepared scrap in their yards.

For further scrap news see p. 117.

quired for two months' operation. During the latter half of 1944 when blast furnace and open hearth grades were not moving, causing prices to plummet, cast scrap supply was tight and continued at ceilings in all markets.

Reports continue to filter in about the dire needs of mills for scrap supplies caused by the unusually bad winter. Now that milder weather prevails it may be anticipated that the severity of the condition will be gradually relieved. The tie-up caused by snow and transportation difficulties over a period of three months may require a considerable period of normal operations, considering the labor shortage, before mill inventories are brought back to a reasonable working position. There is little satisfaction now in recalling that the cycle initiated by the German breakthrough on December and coupled with the severe weather was predicted detail for detail by dealers repeatedly last fall.

PITTSBURGH—Scrap movement has not increased materially in this area, mainly because of the car shortage. At least one mill is very actively seeking scrap more for the cars in which it is shipped into the plant than for the scrap itself. The turnings market is slightly stronger, arresting the downward trend in price that has been prevalent for the past several weeks.

DETROIT—Although automotive list prices paid for turnings were above going levels, there was no indication that this would continue as a market factor, the sales having the aspect of special

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

| | |
|------------------------|------------------|
| No. 1 hvy. melting | \$20.00* |
| RR. hvy. melting | 21.00* |
| No. 2 hvy. melting | 20.00* |
| RR. scrap rails | 21.50* |
| Rails 3 ft. and under | 23.50* |
| No. 1 comp'd sheets | 20.00* |
| Hand bldd. new shts. | 20.00* |
| Hvy. axle turn. | 19.50* |
| Hvy. steel forge turn. | 19.50* |
| Mach. shop turn. | \$13.50 to 14.00 |
| Short shov. turn. | 15.50 to 16.00 |
| Mixed bor. and turn. | 13.50 to 14.00 |
| Cast iron borings | 15.50 to 16.00 |
| Hvy. break. cast | 16.50* |
| No. 1 cupola | 20.00* |
| RR. knuck. and coup. | 24.50* |
| RR. coil springs | 24.50* |
| Rail leaf springs | 24.50* |
| Rolled steel wheels | 24.50* |
| Low phos. bil. crops | 25.00* |
| Low phos. | 22.50* |
| RR. malleable | 22.00* |

CHICAGO

Per gross ton delivered to consumer:

| | |
|----------------------------|------------------|
| No. 1 hvy. melting | \$18.75* |
| No. 2 hvy. melting | 18.75* |
| No. 1 bundles | 18.75* |
| No. 2 dealers' bndls. | \$16.25 to 16.75 |
| Galv. bundles | 14.25 to 14.75 |
| Mach. shop turn. | 8.50 to 9.00 |
| Short shovel. turn. | 9.25 to 9.75 |
| Cast iron borings | 9.25 to 9.75 |
| Mix. borings & turn. | 9.25 to 9.75 |
| Low phos. hvy. forge | 23.75* |
| Low phos. plates | 21.25* |
| No. 1 RR. hvy. melt. | 19.75* |
| Reroll rails | 22.25* |
| Miscellaneous rails | 20.25* |
| Rails 3 ft. and under | 22.25* |
| Locomotive tires, cut | 24.25* |
| Cut bolsters & side frames | 22.25* |
| Angles & splice bars | 22.25* |
| Standard stl. car axles | 25.75* |
| No. 3 steel wheels | 22.75 to 23.25 |
| Couplers & knuckles | 23.25* |
| Agricul. malleable | 22.00* |
| RR. malleable | 22.00* |
| No. 1 mach. cast. | 20.00* |
| No. 1 agricul. cast. | 20.00* |
| Hvy. breakable cast. | 16.50* |
| RR. grate bars | 15.25* |
| Cast iron brake shoes | 15.25* |
| Stove plate | 19.00* |
| Clean auto cast. | 20.00* |
| Cast iron carwheels | 20.00* |

CINCINNATI

Per gross ton delivered to consumer:

| | |
|---------------------|----------------|
| No. 1 hvy. melting | \$19.50* |
| No. 2 hvy. melting | 19.50* |
| No. 1 bundles | 19.50* |
| No. 2 bundles | 19.50* |
| Mach. shop turn. | \$8.50 to 9.00 |
| Shoveling turn. | 16.50* |
| Cast iron borings | 8.50 to 9.50 |
| Mixed bor. & turn. | 8.50 to 9.50 |
| Low phos. plate | 22.00* |
| No. 1 cupola cast. | 20.00* |
| Hvy. breakable cast | 16.50* |
| Stove plate | 19.00* |
| Scrap rails | 21.50* |

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

| | |
|---------------------------|------------------|
| No. 1 hvy. melting | \$15.05* |
| No. 2 hvy. melting | 15.05* |
| No. 1 and 2 bundles | 15.05* |
| Busheling | 15.05* |
| Turnings, shoveling | \$11.00 to 11.06 |
| Machine shop turn. | 9.00 to 9.06 |
| Mixed bor. & turn. | 9.00 to 9.06 |
| Cl'n cast, chem. bor. | 13.06 to 14.15* |
| Truck delivery to foundry | |
| Machinery cast | 21.00 to 23.51* |
| Breakable cast | 21.57 to 21.87* |
| Stove plate | 20.00 to 23.51* |

DETROIT

Per gross ton, brokers' buying prices:

| | |
|---------------------|----------------|
| No. 1 hvy. melting | \$17.32* |
| No. 2 hvy. melting | 17.32* |
| No. 1 bundles | 17.32* |
| New busheling | 17.32* |
| Flashings | 17.32* |
| Mach. shop turn. | \$8.50 to 9.00 |
| Short shov. turn. | 10.50 to 11.50 |
| Cast iron borings | 9.75 to 10.25 |
| Mixed bor. & turn. | 8.50 to 9.00 |
| Low phos. plate | 19.82* |
| No. 1 cupola cast. | 20.00* |
| Charging box cast. | 18.00 to 19.00 |
| Hvy. breakable cast | 16.50* |
| Stove plate | 18.50 to 19.00 |
| Automotive cast | 20.00* |

PHILADELPHIA

Per gross ton delivered to consumer:

| | |
|------------------------|----------|
| No. 1 hvy. melting | \$18.75* |
| No. 2 hvy. melting | 18.75* |
| No. 2 bundles | 18.75* |
| Mach. shop turn. | 13.75* |
| Shoveling turn. | 15.75* |
| Cast iron borings | 14.75* |
| Mixed bor. & turn. | 13.75* |
| No. 1 cupola cast | 20.00* |
| Hvy. breakable cast | 16.50* |
| Cast, charging box. | 19.00* |
| Hvy. axle, forge turn. | 18.25* |
| Low phos. plate | 21.25* |
| Low phos. punchings | 21.25* |
| Billet crops | 21.25* |
| RR. steel wheels | 23.25* |
| RR. coil springs | 23.25* |
| RR. malleable | 22.00* |

ST. LOUIS

Per gross ton delivered to consumer:

| | |
|--------------------------|----------------|
| Heavy melting | \$17.50* |
| Bundled sheets | 17.50* |
| Mach. shop turn. | \$6.50 to 7.00 |
| Hvy. axle turn. | 15.00 to 15.50 |
| Locomotive tires, uncut. | 20.00 |
| Misc. std. sec. rails | 19.00* |
| Rerolling rails | 21.00* |
| Steel angle bars | 21.00* |
| Rails 3 ft. and under | 21.50* |
| RR. springs | 22.00* |
| Steel car axles | 23.50* |
| Stove plate | 19.00* |
| Grate bars | 15.25* |
| Brake shoes | 15.25* |
| RR. malleable | 22.00* |
| Cast iron carwheels | 18.50* |
| No. 1 mach'ry cast | 20.00* |
| Breakable cast | 16.50* |

BIRMINGHAM

Per gross ton delivered to consumer:

| | |
|----------------------|-----------------|
| No. 1 hvy. melting | \$17.00* |
| No. 2 hvy. melting | 17.00* |
| No. 2 bundles | 17.00* |
| No. 1 busheling | 17.00* |
| Long turnings | \$9.50 to 10.00 |
| Cast iron borings | 9.50 to 10.00 |
| Bar crops and plate | 19.50* |
| Structural and plate | 20.00* |
| No. 1 cast | 20.00* |
| Stove plate | 17.00 |
| Steel axles | 18.00* |
| Scrap rails | 18.50 |
| Rerolling rails | 20.50* |
| Angles & splice bars | 20.50* |
| Rails 3 ft. & under | 21.00* |
| Cast iron carwheels | 16.50 to 17.00 |

YOUNGSTOWN

Per gross ton delivered to consumer:

| | |
|---------------------|------------------|
| No. 1 hvy. melting | \$20.00* |
| No. 2 hvy. melting | 20.00* |
| Low phos. plate | 22.50* |
| No. 1 busheling | 20.00* |
| Hydraulic bundles | 20.00* |
| Mach. shop turn. | \$13.00 to 13.50 |
| Short shovel. turn. | 15.00 to 15.50 |
| Cast iron borings | 14.00 to 14.50 |

NEW YORK

Dealers' buying prices per gross ton, on cars

| | |
|----------------------|----------|
| No. 1 hvy. melting | \$15.33* |
| No. 2 hvy. melting | 15.33* |
| Comp. black bundles | 15.33* |
| Comp. galv. bundles | 13.33* |
| Mach. shop turn. | 10.33* |
| Mixed bor. & turn. | 10.33* |
| No. 1 cupola cast. | 20.00* |
| Hvy. breakable cast | 16.50* |
| Charging box cast. | 19.00* |
| Stove plate | 19.00* |
| Clean auto cast. | 20.00* |
| Unstrip. motor blks. | 17.50* |
| Cl'n chem. cast bor. | 14.33* |

BUFFALO

Per gross ton delivered to consumer:

| | |
|-----------------------|----------|
| No. 1 hvy. melting | \$19.25* |
| No. 1 bundles | 19.25* |
| No. 2 bundles | 19.25* |
| No. 2 hvy. melting | 19.25* |
| Mach. shop turn. | 13.00 |
| Shoveling turn. | 16.25* |
| Cast iron borings | 15.25* |
| Mixed bor. & turn. | 14.25* |
| No. 1 cupola cast. | 20.00* |
| Stove plate | 19.00* |
| Low phos. plate | 21.75* |
| Scrap rails | 20.75* |
| Rails 3 ft. & under | 22.75* |
| RR. steel wheels | 23.75* |
| Cast iron car wheels | 20.00* |
| RR. coil & leaf spgs. | 23.75* |
| RR. knuckles & coup. | 23.75* |
| RR. malleable | 22.00* |
| No. 1 busheling | 19.25* |

CLEVELAND

Per gross ton delivered to consumer:

| | |
|----------------------------------|------------------|
| No. 1 hvy. melting | \$19.50* |
| No. 2 hvy. melting | 19.50* |
| Compressed sheet stl. | 19.50* |
| Drop forge flashings | 19.00* |
| No. 2 bundles | 19.50* |
| Mach. shop turn. | \$12.50 to 13.00 |
| Short shovel. | 14.50 to 15.00 |
| No. 1 busheling | 19.50* |
| Steel axle turn. | 19.00* |
| Low phos. billet and bloom crops | 24.50* |
| Cast iron borings | 13.50 to 14.00 |
| Mixed bor. & turn. | 12.50 to 13.00 |
| No. 2 busheling | 17.00* |
| No. 1 machine cast | 20.00* |
| Railroad cast | 20.00* |
| Railroad grate bars | 15.25* |
| Stove plate | 19.00* |
| RR. hvy. melting | 20.50* |
| Rails 3 ft. & under | 23.00* |
| Rails 18 in. & under | 24.25* |
| Rails for rerolling | 23.00* |
| Railroad malleable | 22.00* |
| Elec. furnace punch | 22.00* |

SAN FRANCISCO

Per gross ton delivered to consumer:

| | |
|------------------------|--------------------|
| RR. hvy. melting | \$15.50 to \$16.25 |
| No. 1 hvy. melting | 15.50 to 16.25 |
| No. 2 hvy. melting | 14.50 to 15.25 |
| No. 2 bales | 13.50 to 14.25 |
| No. 3 bales | 9.50 to 10.59 |
| Mach. shop turn. | 7.00 |
| Elec. furn. 1 ft. und. | 15.50 to 17.00 |
| No. 1 cupola cast. | 19.00 to 21.00 |

LOS ANGELES

Per gross ton delivered to consumer:

| | |
|--------------------|--------------------|
| No. 1 hvy. melting | \$14.00 to \$15.00 |
| No. 2 hvy. melting | 13.00 to 14.00 |
| No. 2 bales | 12.00 to 13.00 |
| No. 3 bales | 9.00 to 10.00 |
| Mach. shop turn. | 4.50 |
| No. 1 cupola cast. | 19.00 to 21.00 |

SEATTLE

Per gross ton delivered to consumer:

| | |
|------------------------|------------------|
| RR. hvy. melting | \$13.50 |
| No. 1 hvy. melting | 13.50 |
| No. 3 bundles | 11.50 |
| Elec. furn. 1 ft. und. | \$16.00 to 17.00 |
| No. 1 cupola cast. | 20.00* |

Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.F. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 162-172.

| Flat Rolled Steel: (Cents Per Lb.) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|--|--------------|---------------|---------------|--------------|
| Hot rolled sheets | 2.20 | 2.10 | 2.10 | 2.10 |
| Cold rolled sheets | 3.05 | 3.05 | 3.05 | 3.05 |
| Galvanized sheets (24 ga.) | 3.65 | 3.50 | 3.50 | 3.50 |
| Hot rolled strip | 2.10 | 2.10 | 2.10 | 2.10 |
| Cold rolled strip | 2.80 | 2.80 | 2.80 | 2.80 |
| Plates | 2.20 | 2.10 | 2.10 | 2.10 |
| Plates, wrought iron | 3.80 | 3.80 | 3.80 | 3.80 |
| Stain's c.r. strip (No. 302) | 28.00 | 28.00 | 28.00 | 28.00 |

| Tin and Terne Plate: (Dollars Per Base Box) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|--|--------------|---------------|---------------|--------------|
| Tin plate, standard cokes | \$5.00 | \$5.00 | \$5.00 | \$5.00 |
| Tin plate, electrolytic | 4.50 | 4.50 | 4.50 | 4.50 |
| Special coated mfg. ternes | 4.30 | 4.30 | 4.30 | 4.30 |

| Bars and Shapes: (Cents Per Lb.) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|-------------------------------------|--------------|---------------|---------------|--------------|
| Merchant bars | 2.15 | 2.15 | 2.15 | 2.15 |
| Cold finished bars | 2.65 | 2.65 | 2.65 | 2.65 |
| Alloy bars | 2.70 | 2.70 | 2.70 | 2.70 |
| Structural shapes | 2.10 | 2.10 | 2.10 | 2.10 |
| Stainless bars (No. 302) | 24.00 | 24.00 | 24.00 | 24.00 |
| Wrought iron bars | 4.40 | 4.40 | 4.40 | 4.40 |

| Wire and Wire Products: (Cents Per Lb.) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|--|--------------|---------------|---------------|--------------|
| Plain wire | 2.60 | 2.60 | 2.60 | 2.60 |
| Wire nails | 2.80 | 2.55 | 2.55 | 2.55 |

| Rails: (Dollars Per Gross Ton) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|-----------------------------------|--------------|---------------|---------------|--------------|
| Heavy rails | \$43.00 | \$40.00 | \$40.00 | \$40.00 |
| Light rails | 43.00 | 40.00 | 40.00 | 40.00 |

| Semi-Finished Steel: (Dollars Per Gross Ton) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|---|--------------|---------------|---------------|--------------|
| Rerolling billets | \$34.00 | \$34.00 | \$34.00 | \$34.00 |
| Sheet bars | 34.00 | 34.00 | 34.00 | 34.00 |
| Slabs, rerolling | 34.00 | 34.00 | 34.00 | 34.00 |
| Forging billets | 40.00 | 40.00 | 40.00 | 40.00 |
| Alloy blooms, billets, slabs | 54.00 | 54.00 | 54.00 | 54.00 |

| Wire Rods and Skelp: (Cents Per Lb.) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|---|--------------|---------------|---------------|--------------|
| Wire rods | 2.00 | 2.00 | 2.00 | 2.00 |
| Skelp | 1.90 | 1.90 | 1.90 | 1.90 |

| Pig Iron: (Per Gross Ton) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|------------------------------------|--------------|---------------|---------------|--------------|
| No. 2 fdy., Philadelphia | \$26.84 | \$26.84 | \$25.84 | \$25.84 |
| No. 2, Valley furnace | 25.00 | 25.00 | 24.00 | 24.00 |
| No. 2, Southern Cin'ti | 26.11 | 26.11 | 25.11 | 23.94 |
| No. 2, Birmingham | 21.38 | 21.38 | 20.38 | 20.38 |
| No. 2, foundry, Chicago† | 25.00 | 25.00 | 24.00 | 24.00 |
| Basic, del'd eastern Pa. | 26.34 | 26.34 | 25.34 | 25.34 |
| Basic, Valley furnace | 24.50 | 24.50 | 23.50 | 23.50 |
| Malleable, Chicago† | 25.00 | 25.00 | 24.00 | 24.00 |
| Malleable, Valley | 25.00 | 25.00 | 24.00 | 24.00 |
| L. S. charcoal, Chicago | 37.34 | 37.34 | 37.34 | 37.34 |
| Ferromanganese† | 135.00 | 135.00 | 135.00 | 135.00 |

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡ For carlots at seaboard.

| Scrap: (Per Gross Ton) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|-------------------------------------|--------------|---------------|---------------|--------------|
| Heavy melt'g steel, P'gh. | \$20.00 | \$20.00 | \$20.00 | \$20.00 |
| Heavy melt'g steel, Phila. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melt'g steel, Ch'go | 18.75 | 18.75 | 18.75 | 18.75 |
| No. 1 hy. comp. sheet, Det. | 17.32 | 17.32 | 17.32 | 17.85 |
| Low phos. plate, Youngs'n | 22.50 | 22.50 | 22.50 | 22.50 |
| No. 1 cast, Pittsburgh | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Philadelphia | 20.00 | 20.00 | 20.00 | 20.00 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |

| Coke, Connellsville: (Per Net Ton at Oven) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|---|--------------|---------------|---------------|--------------|
| Furnace coke, prompt | \$7.00 | \$7.00 | \$7.00 | \$7.00 |
| Foundry coke, prompt | 8.25 | 8.25 | 8.25 | 8.25 |

| Non-Ferrous Metals: (Cents Per Lb. to Large Buyers) | Mar. 6, 1945 | Feb. 27, 1945 | Jan. 30, 1945 | Mar. 7, 1944 |
|--|--------------|---------------|---------------|--------------|
| Copper, electro., Conn. | 12.00 | 12.00 | 12.00 | 12.00 |
| Copper, Lake | 12.00 | 12.00 | 12.00 | 12.00 |
| Tin (Straits), New York | 52.00 | 52.00 | 52.00 | 52.00 |
| Zinc, East St. Louis | 8.25 | 8.25 | 8.25 | 8.25 |
| Lead, St. Louis | 6.35 | 6.35 | 6.35 | 6.35 |
| Aluminum, Virgin, del'd | 15.00 | 15.00 | 15.00 | 15.00 |
| Nickel, electrolytic | 35.00 | 35.00 | 35.00 | 35.00 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex. | 14.50 | 14.50 | 14.50 | 14.50 |

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

| FINISHED STEEL | |
|-------------------------|-------------------------|
| March 6, 1945 | 2.25839c. a Lb. |
| One week ago | 2.25839c. a Lb. |
| One month ago | 2.25839c. a Lb. |
| One year ago | 2.27235c. a Lb. |

| PIG IRON | |
|-------------------------|-------------------------------|
| March 6, 1945 | \$24.61 a Gross Ton |
| One week ago | \$24.61 a Gross Ton |
| One month ago | \$23.61 a Gross Ton |
| One year ago | \$23.61 a Gross Ton |

| SCRAP STEEL | |
|-------------------------|-------------------------------|
| March 6, 1945 | \$19.17 a Gross Ton |
| One week ago | \$19.17 a Gross Ton |
| One month ago | \$19.17 a Gross Ton |
| One year ago | \$19.17 a Gross Ton |

| | HIGH | LOW |
|----------------|--------------------|--------------------|
| 1945 | 2.25839c., Jan. 16 | 2.21189c., Jan. 2 |
| 1944 | 2.30837c., Sept. 5 | 2.21189c., Oct. 5 |
| 1943 | 2.25513c. | 2.25513c. |
| 1942 | 2.26190c. | 2.26190c. |
| 1941 | 2.43078c. | 2.43078c. |
| 1940 | 2.30467c., Jan. 2 | 2.24107c., Apr. 16 |
| 1939 | 2.35367c., Jan. 3 | 2.26689c., May 16 |
| 1938 | 2.58414c., Jan. 4 | 2.27207c., Oct. 18 |
| 1937 | 2.58414c., Mar. 9 | 2.32263c., Jan. 4 |
| 1936 | 2.32263c., Dec. 28 | 2.05200c., Mar. 10 |
| 1935 | 2.07642c., Oct. 1 | 2.06492c., Jan. 8 |
| 1934 | 2.15367c., Apr. 24 | 1.95757c., Jan. 2 |
| 1933 | 1.95578c., Oct. 3 | 1.75836c., May 2 |
| 1932 | 1.89196c., July 5 | 1.83901c., Mar. 1 |
| 1931 | 1.99626c., Jan. 13 | 1.86586c., Dec. 29 |
| 1930 | 2.25488c., Jan. 7 | 1.97319c., Dec. 9 |
| 1929 | 2.31773c., May 28 | 2.26498c., Oct. 29 |

| | HIGH | LOW |
|--------------------------|------------------|-----------------|
| 2045 | \$24.61, Feb. 20 | \$23.61, Jan. 2 |
| 2361 | \$23.61 | \$23.61 |
| 2361 | \$23.61 | \$23.61 |
| 2361 | \$23.61 | \$23.61 |
| 2361, Mar. 20 | \$23.45, Jan. 2 | |
| 2345, Dec. 23 | 22.61, Jan. 2 | |
| 2261, Sept. 19 | 20.61, Sept. 12 | |
| 2325, June 21 | 19.61, July 6 | |
| 2325, Mar. 9 | 20.25, Feb. 16 | |
| 1974, Nov. 24 | 18.73, Aug. 11 | |
| 1884, Nov. 5 | 17.83, May 14 | |
| 1790, May 1 | 16.90, Jan. 27 | |
| 1690, Dec. 5 | 13.56, Jan. 3 | |
| 1481, Jan. 5 | 13.56, Dec. 6 | |
| 1590, Jan. 6 | 14.79, Dec. 15 | |
| 1821, Jan. 7 | 15.90, Dec. 16 | |
| 1871, May 14 | 18.21, Dec. 17 | |

| | HIGH | LOW |
|---------------------------|------------------|------------------|
| 1917 | \$19.17 | \$19.17 |
| 1917 | \$19.17 | \$15.67, Oct. 24 |
| 1917 | \$19.17 | \$19.17 |
| 1917 | \$19.17 | \$19.17 |
| \$22.00, Jan. 7 | \$19.17, Apr. 10 | |
| 2183, Dec. 30 | 16.04, Apr. 9 | |
| 2250, Oct. 3 | 14.08, May 16 | |
| 15.00, Nov. 22 | 11.00, June 7 | |
| 21.92, Mar. 30 | 12.67, June 8 | |
| 17.75, Dec. 21 | 12.67, June 9 | |
| 13.42, Dec. 10 | 10.33, Apr. 29 | |
| 13.00, Mar. 13 | 9.50, Sept. 25 | |
| 12.25, Aug. 8 | 6.75, Jan. 3 | |
| 8.50, Jan. 12 | 6.43, July 5 | |
| 11.33, Jan. 6 | 8.50, Dec. 29 | |
| 15.00, Feb. 18 | 11.25, Dec. 9 | |
| 17.58, Jan. 29 | 14.08, Dec. 3 | |

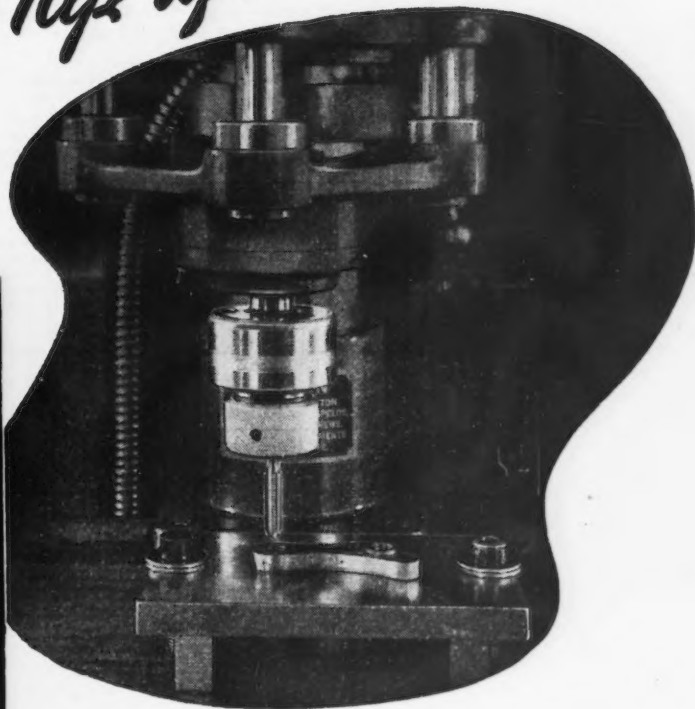
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern Iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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180% Increase in production
25% Increase in tap life
Fewer rejects



With *unskilled women* operators replacing trained men, Flint Manufacturer's Machine Service Co. obtained the above results by using DETROIT lead-screw type tapping machines instead of conventional equipment.

The job involved was tapping a 7/16—20 NS thread 3/8 in. deep to a class 3 fit in a 50 cal. machine gun part made of tough 1050 steel.

Equipment consisted of a Detroit Light Duty LTM-16 machine equipped with simple locating pins on the work table and floating tap holder.

Production obtained per machine was 450 pieces per hour equivalent to an overall average, floor to floor, of 8 seconds per piece. High accuracy obtained is credited to an unique LEAD SCREW drive.

We will be glad to furnish you with a bulletin covering the Detroit LTM line of tapping machines. Ask for Bulletin LTM-44.

DETROIT
TAP & TOOL CO.

8432 BUTLER AVENUE . . . DETROIT 11, U. S. A.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in.. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) Portland and Seattle price, San Francisco 2.50c. (13) This base price for annealed, bright finish wires, commercial spring wire. (14) Deduct 10c. per 100 lb. for plates not produced to sheared mill or universal mill width and length tolerances.

| Basing Point Product | | | | | | | | | | | | | DELIVERED TO | | | |
|---|----------------------------|----------------------------|----------------------------|----------------|-----------------|---------|-----------------|------------------------|---|----------------------------------|------------------------|---------------------------------|--------------|-------------|-------------------|--|
| | Pitts- burgh | Chicago | Gary | Cleve- land | Birm- ingham | Buffalo | Youngs- town | Spar- rows Point | Granite City | Middle- town, Ohio | Gulf Ports, Cars | 10 Pacific Ports, Cars | Detroit | New York | Phila- delphia | |
| SHEETS | | | | | | | | | | | | | | | | |
| Hot rolled | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.30¢ | 2.20¢ | | 2.75¢ | 2.30¢ | 2.44¢ | 2.37¢ | |
| Cold rolled ¹ | 3.05¢ | 3.05¢ | 3.05¢ | 3.05¢ | | 3.05¢ | 3.05¢ | | 3.15¢ | 3.05¢ | | 3.70¢ | 3.15¢ | 3.39¢ | 3.37¢ | |
| Galvanized (24 gage) | 3.65¢ | 3.65¢ | 3.65¢ | | 3.65¢ | 3.65¢ | 3.65¢ | 3.65¢ | 3.75¢ | 3.65¢ | | 4.20¢ | | 3.89¢ | 3.82¢ | |
| Enameling (20 gage) | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | | 3.35¢ | | 3.45¢ | 3.35¢ | | 4.00¢ | 3.45¢ | 3.71¢ | 3.67¢ | |
| Long ternes ² | 3.80¢ | 3.80¢ | 3.80¢ | | | | | | | | | 4.55¢ | | 4.16¢ | 4.12¢ | |
| STRIP | | | | | | | | | | | | | | | | |
| Hot rolled ³ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | | | 2.10¢ | | 2.75¢ | 2.20¢ | 2.46¢ | | |
| Cold rolled ⁴ | 2.80¢ | 2.90¢ | | 2.80¢ | | | 2.80¢ | | (Worcester=3.00¢) | | | | 2.90¢ | 3.16¢ | | |
| Cooperage stock | 2.20¢ | 2.20¢ | | | 2.20¢ | | 2.20¢ | | | | | | | 2.56¢ | | |
| Commodity C-R | 2.95¢ | 3.05¢ | | 2.95¢ | | | 2.95¢ | | (Worcester=3.35¢) | | | | 3.05¢ | 3.31¢ | | |
| TIN PLATE | | | | | | | | | | | | | | | | |
| Standard cokes, base box | \$5.00 | \$5.00 | \$5.00 | | | | | | \$5.10 | | | | | 5.36¢ | 5.32¢ | |
| Electro, box (0.25 lb. (0.50 lb. (0.75 lb. | \$4.35 \$4.50 \$4.65 | \$4.35 \$4.50 \$4.65 | \$4.35 \$4.50 \$4.65 | | | | | | \$4.60 \$4.75 | | | | | | | |
| BLACK PLATE 29 gage ⁵ | 3.05¢ | 3.05¢ | 3.05¢ | | | | | | 3.15¢ | | | 4.05¢ ¹² | | | 3.37¢ | |
| TERNES, MFG. Special coated, base box | \$4.30 | \$4.30 | \$4.30 | | | | | | \$4.40 | | | | | | | |
| BAR | | | | | | | | | | | | | | | | |
| Carbon steel | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | (Duluth=2.25¢) | | 2.50¢ | 2.80¢ | 2.25¢ | 2.49¢ | 2.47¢ | |
| Rail steel ⁶ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | | 2.50¢ | 2.80¢ | | | | |
| Reinforcing (billet) ⁷ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | 2.50¢ | 2.55¢ ¹³ | 2.25¢ | 2.39¢ | | |
| Reinforcing (rail) ⁷ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | 2.15¢ | | | | 2.50¢ | 2.55¢ ¹³ | 2.25¢ | | 2.47¢ | |
| Cold finished ⁸ | 2.65¢ | 2.65¢ | 2.65¢ | 2.65¢ | | 2.65¢ | | | (Detroit=2.70¢) | | (Toledo=2.80¢) | | | 2.99¢ | 2.97¢ | |
| Alloy, hot rolled | 2.70¢ | 2.70¢ | | | | 2.70¢ | | | (Bethlehem, Massillon, Canton=2.70¢) | | | | 2.80¢ | | | |
| Alloy, cold drawn | 3.35¢ | 3.35¢ | 3.35¢ | 3.35¢ | | 3.35¢ | | | | | | | 3.45¢ | | | |
| PLATES | | | | | | | | | | | | | | | | |
| Carbon steel ¹⁰ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | 2.20¢ | | 2.20¢ | 2.20¢ | 2.45¢ | (Coatesville and Claymont=2.10¢) | | 2.55¢ | 2.75¢ | 2.42¢ | 2.39¢ | |
| Floor plates | 3.35¢ | 3.35¢ | | | | | | | | | 3.70¢ | 4.00¢ | | 3.71¢ | 3.67¢ | |
| Alloy | 3.50¢ | 3.50¢ | | | | | | | | | 3.95¢ | 4.15¢ | | 3.70¢ | 3.59¢ | |
| SHAPES | | | | | | | | | | | | | | | | |
| Structural | 2.10¢ | 2.10¢ | 2.10¢ | | 2.10¢ | 2.10¢ | | | (Bethlehem=2.10¢) | | 2.45¢ | 2.75¢ | | 2.27¢ | 2.215¢ | |
| SPRING STEEL, C-R | | | | | | | | | | | | | | | | |
| 0.26 to 0.50 Carbon | 2.80¢ | | | 2.80¢ | | | | | (Worcester=3.00¢) | | | | | | | |
| 0.51 to 0.75 Carbon | 4.30¢ | | | 4.30¢ | | | | | (Worcester=4.50¢) | | | | | | | |
| 0.76 to 1.00 Carbon | 6.15¢ | | | 6.15¢ | | | | | (Worcester=6.35¢) | | | | | | | |
| 1.01 to 1.25 Carbon | 8.35¢ | | | 8.35¢ | | | | | (Worcester=8.55¢) | | | | | | | |
| WIRE ⁹ | | | | | | | | | | | | | | | | |
| Bright ¹⁴ | 2.60¢ | 2.60¢ | | 2.60¢ | 2.60¢ | | | | (Worcester=2.70¢) | | (Duluth=2.65¢) | | 3.10¢ | | 2.92¢ | |
| Galvanized | | | | | | | | | Add proper size extra and galvanizing extra to Bright Wire base | | | | | | | |
| Spring (High Carbon) | 3.20¢ | 3.20¢ | | 3.20¢ | | | | | (Worcester=3.30¢) | | | 3.70¢ | | | 3.52¢ | |
| PILING | | | | | | | | | | | | | | | | |
| Steel Sheet | 2.40¢ | 2.40¢ | | | | 2.40¢ | | | | | | 2.95¢ | | | 2.72¢ | |

EXCEPTIONS TO PRICE SCHED. NO. 6.

Slabs—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50; Kaiser Co. rerolling \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

Blooms—Phoenix Iron Co. (rerolling) \$41; (forging) \$47; Pgh. Steel Co. (rerolling) \$38.25, (forging) \$44.25; Wheeling Steel Corp.

(rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64, (shell steel) \$74.64 f.o.b. Los Angeles.

Sheet bar—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.

Billets, Forging—Andrews Steel Co. \$50 basing pts.; Pollansbee Steel Corp. \$49.50 Toronto, Ohio; Phoenix Iron Co. \$47 mill; Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pitts-

burgh Steel Co. \$49.50; Kaiser Co. \$64.64, (shell steel) \$74.64, f.o.b. Los Angeles.

Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Contin-

PRICES

Steel Corp. (1% x 1%) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich.; Geneva Steel Co. \$58.64 f.o.b. Pacific Coast; Pgh. Steel Co. \$43.50; Kaiser Co. \$58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. \$2.35 basing pts. (export) \$2.50 Phoenixville; Knoxville Iron Co. \$2.30 basing points; Kaiser Co. \$3.20 f.o.b. Los Angeles.

Rails—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. \$2.65 mill; Knoxville Iron Co. \$2.25 basing pts.; Kaiser Co. and Geneva Steel Co. \$3.20 Pacific Ports; Central Iron and Steel Co. \$2.50 basing points; Granite City Steel Co. \$2.35 Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, \$2.85 mill; Eckels-Nye Steel Corp. \$2.50 basing pts. (rail steel) \$2.40; Phoenix Iron Co. \$2.40 basing pts.; Sweet Steel Co. (rail steel) \$2.33 mill; Joslyn Mfg. & Supply Co., \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), \$2.35 Chicago; Knoxville Iron Co., \$2.30 basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.; Milton Mfg. Co., \$2.75 f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel Corp., Benwood, \$2.05 per 100 lb.

Reinforcing Bars—W. Ames & Co., 10 tons and over, \$2.85 mill; Sweet Steel Co. (rail steel), \$2.33 mill; Columbia Steel Co., \$2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shaffing Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., \$2.30 Chicago; Knoxville Iron Co., \$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., \$2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co., \$3.75 basing pts.; Parkersburg Iron & Steel Co., \$3.85 Parkersburg; Apollo Steel Co., \$3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., \$2.20; rods, heavier than 9/32, \$2.35; bright wire, \$2.725; bright nails, \$2.90; lead and furnace annealed wire, \$2.85; pot annealed wire, \$2.85; galvanized barbed wire, \$3.90; plain staples, \$2.55; galvanized staples, \$2.65; bright spring wire, \$3.30; galvanized spring wire, \$3.45.



You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS
5909 KENNERLY AVENUE

ESTABLISHED 1857
ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • • 810 W. Washington Blvd.
DENVER • • • 1534 W. 26th Street



SAN FRANCISCO • • • 520 Fourth Street
PORTLAND • • • 914 N. W. 14th Avenue
SEATTLE • • • 3410 First Avenue South

MACHINED BRONZE BEARINGS GRAPHITED AND OILLESS BRONZE BEARINGS BRONZE GEAR BLANKS MACHINED BRONZE PARTS

S & H Bronze Bearings are made of cast bronze, under the most modern conditions and of specifications to meet the most exacting requirements. We are manufacturers of plain bronze and graphited and oilless bronze bearings for all branches of the Government Services, as well as plain cylinder type, single and double flange, thrust washers, from 1/8" in diameter to 20" in diameter. We also manufacture special parts made of cast bronze. Our manufacturing methods and equipment enable us to meet the most exacting machining specifications.

If it's Bronze



We make it

INDUSTRIAL

BEARINGS

S. & H. Bearing and Manufacturing Co.

340-344 North Avenue, East

Cranford

New Jersey

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

| Cities | SHEETS | | | STRIP | | Plates 1/4 in. and heavier | Structural Shapes | BARS | | ALLOY BARS | | | |
|----------------|----------------------------|----------------|-------------------------|---------------|----------------|----------------------------------|----------------------|---------------|------------------|------------------------------|--------------------------------------|------------------------------|--------------------------------------|
| | Hot Rolled (10 gage) | Cold Rolled | Galvanized (24 gage) | Hot Rolled | Cold Rolled | | | Hot Rolled | Cold Finished | Hot Rolled, NE 8617-20 | Hot Rolled, NE 9442-45 Ann. | Cold Drawn, NE 8617-20 | Cold Drawn, NE 9442-40 Ann. |
| **Philadelphia | \$3.618 | \$4.872* | \$5.168a | \$3.922 | \$4.772 | \$3.705 | \$3.686 | \$3.822 | \$4.072 | \$5.966 | \$7.066 | \$7.272 | \$8.322 |
| New York | 3.690 | 4.613* | 5.160 | 3.974* | 4.772 | 3.668 | 3.758 | 3.853 | 4.103 | 6.008 | 7.108 | 7.303 | 8.353 |
| Boston | 3.844 | 4.744* | 5.374* | 4.108 | 4.715 | 4.012 | 3.912 | 4.044 | 4.144 | 6.162 | 7.262 | 7.344 | 8.394 |
| Baltimore | 3.494 | 4.852 | 5.044 | 3.902 | 4.752 | 3.694 | 3.759 | 3.802 | 4.052 | ..... | ..... | ..... | ..... |
| Norfolk | 3.871 | 4.965 | 5.521 | 4.165 | 4.885 | 4.071 | 4.002 | 4.065 | 4.165 | ..... | ..... | ..... | ..... |
| Chicago | 3.35 | 4.20 | 5.381 | 3.60 | 4.651* | 3.65 | 3.55 | 3.50 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| Milwaukee | 3.487 | 4.337* | 5.422* | 3.737 | 4.787* | 3.787 | 3.687 | 3.637 | 3.887 | 5.987 | 7.087 | 7.087 | 8.137 |
| Cleveland | 3.45 | 4.40 | 5.027* | 3.60 | 4.45 | 3.50 | 3.588 | 3.35 | 3.75 | 5.956 | 7.056 | 6.85 | 7.90* |
| Buffalo | 3.45 | 4.40 | 4.90* | 3.819 | 4.689 | 3.73 | 3.40 | 3.35 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| Detroit | 3.55 | 4.50 | 5.15* | 3.70 | 4.689* | 3.709 | 3.661 | 3.45 | 3.80 | 6.08 | 7.18 | 7.159 | 8.209 |
| Cincinnati | 3.525 | 4.475* | 4.975* | 3.675 | 4.711 | 3.711 | 3.691 | 3.611 | 4.011 | ..... | ..... | ..... | ..... |
| St. Louis | 3.497 | 4.347* | 5.322* | 3.747 | 4.931* | 3.797 | 3.697 | 3.647 | 4.031 | 6.131 | 7.231 | 7.231 | 8.281 |
| Pittsburgh | 3.45 | 4.40 | 4.90 | 3.60 | 4.45 | 3.50 | 3.40 | 3.35 | 3.75 | 5.75 | 6.85 | 6.85 | 7.90 |
| St. Paul | 3.965 | 5.443 | 5.407* | 4.215 | 4.951* | 3.913 | 3.813 | 3.763 | 4.361 | 6.09 | 7.19 | 7.561 | 8.711 |
| Omaha | 3.61 | 4.48 | 5.754* | 4.215 | 4.951* | 4.265 | 4.165 | 4.115 | 4.43 | ..... | ..... | ..... | ..... |
| Indianapolis | 3.55 | 4.50 | 4.718 | 4.918 | 3.768 | 3.65 | 3.55 | 3.50 | 3.88 | 6.08 | 7.18 | 7.18 | 8.23 |
| Birmingham | 4.065* | 4.66 | 3.415 | 4.215 | ..... | 4.165 | 4.065 | 4.015 | 4.33 | ..... | ..... | ..... | ..... |
| New Orleans | 4.158* | 4.95 | 5.508 | 4.308 | ..... | 4.258 | 4.158* | 4.108* | 4.629 | ..... | ..... | ..... | ..... |
| Houston | 3.863 | 5.573 | 6.463* | 4.313 | ..... | 4.35 | 4.25 | 3.75 | 6.373* | 7.223 | 8.323 | 8.323 | 9.373 |
| Los Angeles | 5.10 | 7.20* | 6.25* | 4.95 | 5.613* | 5.05 | 4.65 | 4.40 | 5.583 | 8.304 | 9.404 | 9.404 | 10.454 |
| San Francisco | 4.651* | 7.30* | 6.50* | 4.501* | 7.333* | 4.751* | 4.351* | 4.151* | 5.333 | 8.304 | 9.404 | 9.404 | 10.454 |
| Seattle | 4.751* | 7.05* | 6.10* | 4.251* | ..... | 4.851* | 4.451* | 4.251* | 5.783 | ..... | ..... | ..... | ..... |
| Portland | 4.751* | 6.60* | 5.90* | 4.751* | ..... | 4.851* | 4.451* | 4.251* | 5.333 | 8.304 | 9.404 | 8.304 | 9.404 |
| Salt Lake City | 4.631* | ..... | 6.321* | 5.531* | ..... | 5.081* | 4.981* | 4.881* | 5.90 | ..... | ..... | ..... | ..... |

National Emergency Steels MILL EXTRAS

| Designation | Basic Open-Hearth | | Electric Furnace | | Designation | Basic Open-Hearth | | Electric Furnace | |
|-------------|-----------------------|----------------------------------|-----------------------|----------------------------------|-------------|-----------------------|----------------------------------|-----------------------|----------------------------------|
| | Bars and Bar-Strip | Billets, Blooms, and Slabs | Bars and Bar-Strip | Billets, Blooms, and Slabs | | Bars and Bar-Strip | Billets, Blooms, and Slabs | Bars and Bar-Strip | Billets, Blooms, and Slabs |
| NE 8612 | 0.65¢ | \$13.00 | \$1.15 | \$23.00 | NE 9427 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8615 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9430 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8617 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9432 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8620 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9435 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8622 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9437 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8625 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9440 | 0.75 | 15.00 | 1.25 | 25.00 |
| NE 8627 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9442 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8630 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9445 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8632 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9447 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8635 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9450 | 0.80 | 16.00 | 1.30 | 26.00 |
| NE 8637 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9722 | 0.65¢ | \$13.00 | \$1.15 | \$23.00 |
| NE 8640 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9727 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8642 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9732 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8645 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9737 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8647 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9742 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8650 | 0.65 | 13.00 | 1.15 | 23.00 | NE 9745 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8712 | 0.70¢ | \$14.00 | \$1.20 | \$24.00 | NE 9747 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8715 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9750 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8717 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9763 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8720 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9768 | 0.65 | 13.00 | 1.15 | 23.00 |
| NE 8722 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9830 | \$1.30 | \$26.00 | \$1.80 | \$36.00 |
| NE 8725 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9832 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8727 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9835 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8730 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9837 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8732 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9840 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8735 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9842 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8737 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9845 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8740 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9847 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8742 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9850 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 8745 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9912 | \$1.20 | \$24.00 | \$1.55 | \$31.00 |
| NE 8747 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9915 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 8750 | 0.70 | 14.00 | 1.20 | 24.00 | NE 9917 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9415 | 0.75¢ | \$15.00 | \$1.25 | \$25.00 | NE 9920 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9417 | 0.75 | 15.00 | 1.25 | 25.00 | NE 9922 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9420 | 0.75 | 15.00 | 1.25 | 25.00 | NE 9925 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9422 | 0.75 | 15.00 | 1.25 | 25.00 | | | | | |
| NE 9425 | 0.75 | 15.00 | 1.25 | 25.00 | | | | | |

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

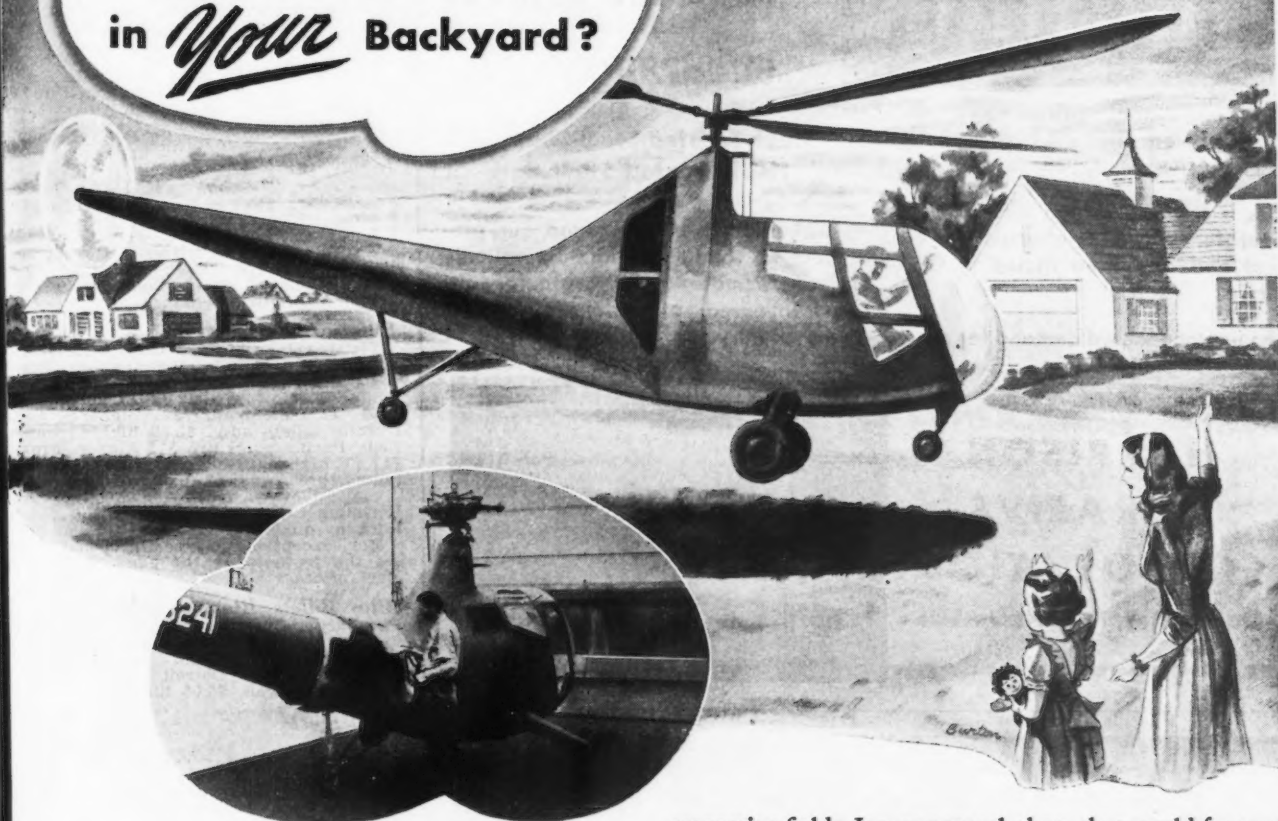
Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (19) 4000 lb. and over. (20) 5000 lb. and over. (21) 6000 lb. and over. (22) 7000 lb. and over. (23) 8000 lb. and over. (24) 9000 lb. and over. (25) 10,000 lb. and over. (26) 11,000 lb. and over. (27) 12,000 lb. and over. (28) 13,000 lb. and over. (29) 14,000 lb. and over. (30) 15,000 lb. and over. (31) 16,000 lb. and over. (32) 17,000 lb. and over. (33) 18,000 lb. and over. (34) 19,000 lb. and over. (35) 20,000 lb. and over. (36) 21,000 lb. and over. (37) 22,000 lb. and over. (38) 23,000 lb. and over. (39) 24,000 lb. and over. (40) 25,000 lb. and over. (41) 26,000 lb. and over. (42) 27,000 lb. and over. (43) 28,000 lb. and over. (44) 29,000 lb. and over. (45) 30,000 lb. and over. (46) 31,000 lb. and over. (47) 32,000 lb. and over. (48) 33,000 lb. and over. (49) 34,000 lb. and over. (50) 35,000 lb. and over. (51) 36,000 lb. and over. (52) 37,000 lb. and over. (53) 38,000 lb. and over. (54) 39,000 lb. and over. (55) 40,000 lb. and over. (56) 41,000 lb. and over. (57) 42,000 lb. and over. (58) 43,000 lb. and over. (59) 44,000 lb. and over. (60) 45,000 lb. and over. (61) 46,000 lb. and over. (62) 47,000 lb. and over. (63) 48,000 lb. and over. (64) 49,000 lb. and over. (65) 50,000 lb. and over. (66) 51,000 lb. and over. (67) 52,000 lb. and over. (68) 53,000 lb. and over. (69) 54,000 lb. and over. (70) 55,000 lb. and over. (71) 56,000 lb. and over. (72) 57,000 lb. and over. (73) 58,000 lb. and over. (74) 59,000 lb. and over. (75) 60,000 lb. and over. (76) 61,000 lb. and over. (77) 62,000 lb. and over. (78) 63,000 lb. and over. (79) 64,000 lb. and over. (80) 65,000 lb. and over. (81) 66,000 lb. and over. (82) 67,000 lb. and over. (83) 68,000 lb. and over. (84) 69,000 lb. and over. (85) 70,000 lb. and over. (86) 71,000 lb. and over. (87) 72,000 lb. and over. (88) 73,000 lb. and over. (89) 74,000 lb. and over. (90) 75,000 lb. and over. (91) 76,000 lb. and over. (92) 77,000 lb. and over. (93) 78,000 lb. and over. (94) 79,000 lb. and over. (95) 80,000 lb. and over. (96) 81,000 lb. and over. (97) 82,000 lb. and over. (98) 83,000 lb. and over. (99) 84,000 lb. and over. (100) 85,000 lb. and over. (101) 86,000 lb. and over. (102) 87,000 lb. and over. (103) 88,000 lb. and over. (104) 89,000 lb. and over. (105) 90,000 lb. and over. (106) 91,000 lb. and over. (107) 92,000 lb. and over. (108) 93,000 lb. and over. (109) 94,000 lb. and over. (110) 95,000 lb. and over. (111) 96,000 lb. and over. (112) 97,000 lb. and over. (113) 98,000 lb. and over. (114) 99,000 lb. and over. (115) 100,000 lb. and over. (116) 101,000 lb. and over. (117) 102,000 lb. and over. (118) 103,000 lb. and over. (119) 104,000 lb. and over. (120) 105,000 lb. and over. (121) 106,000 lb. and over. (122) 107,000 lb. and over. (123) 108,000 lb. and over. (124) 109,000 lb. and over. (125) 110,000 lb. and over. (126) 111,000 lb. and over. (127) 112,000 lb. and over. (128) 113,000 lb. and over. (129) 114,000 lb. and over. (130) 115,000 lb. and over. (131) 116,000 lb. and over. (132) 117,000 lb. and over. (133) 118,000 lb. and over. (134) 119,000 lb. and over. (135) 120,000 lb. and over. (136) 121,000 lb. and over. (137) 122,000 lb. and over. (138) 123,000 lb. and over. (139) 124,000 lb. and over. (140) 125,000 lb. and over. (141) 126,000 lb. and over. (142) 127,000 lb. and over. (143) 128,000 lb. and over. (144) 129,000 lb. and over. (145) 130,000 lb. and over. (146) 131,000 lb. and over. (147) 132,000 lb. and over. (148) 133,000 lb. and over. (149) 134,000 lb. and over. (150) 135,000 lb. and over. (151) 136,000 lb. and over. (152) 137,000 lb. and over. (153) 138,000 lb. and over. (154) 139,000 lb. and over. (155) 140,000 lb. and over. (156) 141,000 lb. and over. (157) 142,000 lb. and over. (158) 143,000 lb. and over. (159) 144,000 lb. and over. (160) 145,000 lb. and over. (161) 146,000 lb. and over. (162) 147,000 lb. and over. (163) 148,000 lb. and over. (164) 149,000 lb. and over. (165) 150,000 lb. and over. (166) 151,000 lb. and over. (167) 152,000 lb. and over. (168) 153,000 lb. and over. (169) 154,000 lb. and over. (170) 155,000 lb. and over. (171) 156,000 lb. and over. (172) 157,000 lb. and over. (173) 158,000 lb. and over. (174) 159,000 lb. and over. (175) 160,000 lb. and over. (176) 161,000 lb. and over. (177) 162,000 lb. and over. (178) 163,000 lb. and over. (179) 164,000 lb. and over. (180) 165,000 lb. and over. (181) 166,000 lb. and over. (182) 167,000 lb. and over. (183) 168,000 lb. and over. (184) 169,000 lb. and over. (185) 170,000 lb. and over. (186) 171,000 lb. and over. (187) 172,000 lb. and over. (188) 173,000 lb. and over. (189) 174,000 lb. and over. (190) 175,000 lb. and over. (191) 176,000 lb. and over. (192) 177,000 lb. and over. (193) 178,000 lb. and over. (194) 179,000 lb. and over. (195) 180,000 lb. and over. (196) 181,000 lb. and over. (197) 182,000 lb. and over. (198) 183,000 lb. and over. (199) 184,000 lb. and over. (200) 185,000 lb. and over. (201) 186,000 lb. and over. (202) 187,000 lb. and over. (203) 188,000 lb. and over. (204) 189,000 lb. and over. (205) 190,000 lb. and over. (206) 191,000 lb. and over. (207) 192,000 lb. and over. (208) 193,000 lb. and over. (209) 194,000 lb. and over. (210) 195,000 lb. and over. (211) 196,000 lb. and over. (212) 197,000 lb. and over. (213) 198,000 lb. and over. (214) 199,000 lb. and over. (215) 200,000 lb. and over. (216) 201,000 lb. and over. (217) 202,000 lb. and over. (218) 203,000 lb. and over. (219) 204,000 lb. and over. (220) 205,000 lb. and over. (221) 206,000 lb. and over. (222) 207,000 lb. and over. (223) 208,000 lb. and over. (224) 209,000 lb. and over. (225) 210,000 lb. and over. (226) 211,000 lb. and over. (227) 212,000 lb.

Will Mr. Sikorsky's
Idea Come to Roost
in *Your* Backyard?



WHO KNOWS? Maybe you—along with thousands of other Americans—will be supplementing the family car with a helicopter only a few years after “V” day when air transportation will be available from your own backyard. For Sikorsky’s modern, direct-lift helicopter can be flown from and landed in any spot where there is room to set the machine down with a few feet to spare.

Are helicopters practical now? The Army Air Forces should know—they’re already using scores of them! And more are constantly rolling off the world’s first helicopter assembly line at Sikorsky Aircraft Division of United Aircraft!

In providing tools and equipment for this pioneering mass production venture, Sikorsky Aircraft was careful to choose only products of proved superiority in their

respective fields. It was natural, then, that world-famous DeVilbiss Spray Equipment should be selected for the important work of painting fuselages and parts. Sikorsky not only specified DeVilbiss spray guns and other equipment for spraying operations, but also installed a DeVilbiss spray booth in which a curtain of water washes dust and vapors from the exhausted air. And Sikorsky Aircraft will not have to convert its production at war’s end—can employ this same DeVilbiss spray system for painting helicopters for peacetime use.

Unlike Sikorsky, however, numerous manufacturers will face conversion problems after the war. If you are one of these, call a DeVilbiss engineer for help in planning the best and fastest spray system for painting your post-war product. Chances are 10 to 1 DeVilbiss has all the equipment you will need. If not, we’ll design it for you!

THE DEVILBISS COMPANY, TOLEDO 1, OHIO

Canadian Plant: Windsor, Ontario



DE VILBISS
Spray Systems

SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS



HEAT-TREATED STEEL SHOT

**We manufacture
shot and grit for
endurance**

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

**Heat-Treated Steel Shot and
Heat-Treated Steel Grit**

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

**HARRISON
ABRASIVE
CORPORATION**

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT



OHIO SHEARS

SOLID STEEL—all grades

LAID STEEL—hi-speed and carbon

ROTARY SHEARS and SLITTERS

The OHIO KNIFE Co.
CINCINNATI 23,
OHIO



PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill... \$31.00
Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown... \$36.00
Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh... \$45.00
Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00; Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Rerolling... \$34.00
Forging quality... 40.00
For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton... \$54.00
Price delivered Detroit \$2.00 higher; East Michigan, \$3.00 higher.

Shell Steel

Per Gross Ton
3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over 56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
Prices delivered Detroit are \$2.00 higher; East Michigan, \$3 higher.
Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.
Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.
Per Lb.
Grooved, universal and sheared .. 1.90c

Wire Rods

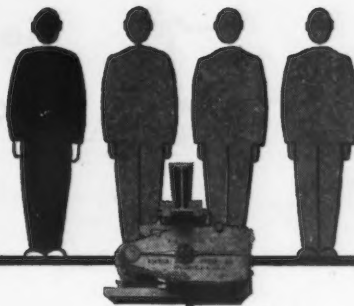
(No. 5 to 9/32 in.)
Per Lb.
Pittsburgh, Chicago, Cleveland ... 2.00c
Worcester, Mass. 2.10c
Birmingham 2.00c
San Francisco 2.50c
Galveston 2.25c
9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.
High speed 67c
Straight molybdenum 54c
Tungsten-molybdenum 57 1/2c
High-carbon-chromium 43c
Oil hardening 24c
Special carbon 22c
Extra carbon 18c
Regular carbon 14c
Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

SHORT OF HANDS?



Hire a Hoist!

Ever check the time your workers spend in lifting and carrying the product you make? Glance at your time-study figures. An awful chunk of production time is still being spent in some plants in just moving things around. In these short-handed days, that really hurts.

Make the most of your manpower. By making limited (and often inexperienced) manpower go further, R & M Hoists give you the equivalent of several extra hands. With them, you can move materials faster and easier with fewer men (or women). Here are two of the many R & M Hoists that can do that kind of job.



The R & M Type F 1/2 Hoist has 1000 — 2000-pound capacity. It is provided with pendent, push-button control. A step forward in improved design, better materials, and manufacturing economies that provide a better hoist at lower cost in both purchase price and operation.

The R & M Type F Hoist has 1000 — 15,000 - pound capacity. Push-button control is standard. Operating with low headroom and handling loads from any angle with perfect balance, the Type F Hoist makes a one-man job of many otherwise cumbersome operations.



Get in touch with your nearest R & M Sales and Service Office.

Albany.....364 Broadway
Atlanta.....319 Walton Bldg.
Baltimore, Lombard & Concord St.
Boston.....74 Needham St.
Chicago.....2400 W. Madison St.
Cincinnati.....418 New St.
Cleveland...470 Rockefeller Bldg.
Dallas.....1100 Cadiz St.
Montreal...Lyman Tube & Supply Co., Ltd.

Denver.....1420 16th St.
Detroit...7376 Grand River Ave.
Houston...3715 Harrisburg Blvd.
Jacksonville...305 Bisbee Bldg.
Kansas City, Mo....215 Pershing
Los Angeles....2257 E. 15th St.
Meriden, Conn....401 Liberty St.
Newark.....700 Bergen St.
New York.....200 Varick St.
Philadelphia...401 N. Broad St.
Pittsburgh...H. W. Oliver Bldg.
Providence.....44 Clifford St.
San Francisco, 116 New Mtgmy St.
Seattle.....216 Walker Bldg.
Syracuse...204 State Tower Bldg.

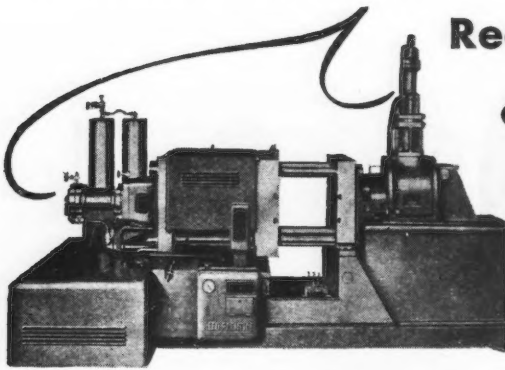
ROBBINS & MYERS • INC.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

In Canada: Robbins & Myers Co., of Canada, Ltd., Brantford, Ont.

MOTORS • MACHINE DRIVES • FANS • MOYNO PUMPS • FOUNDED 1878

Hannifin Cylinders power the Reed-Prentice die casting machines



The Reed-Prentice hydraulic die casting machines use Hannifin precision hydraulic cylinders for both die closing and plunger operation. Die casting service, one of the most severe tests of hydraulic cylinders, requires the best. Hannifin precision hydraulic cylinders meet these requirements. Cylinder bodies are bored and honed, providing for efficient piston fit, maximum power and minimum fluid slip. No-tie-rod design pro-

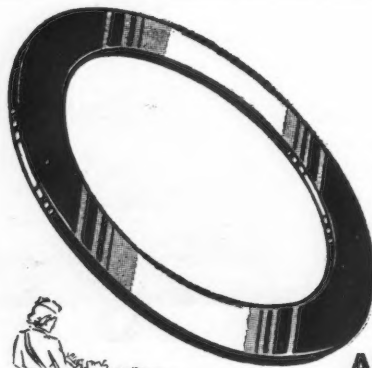
vides a strong, simple cylinder assembly, easily mounted.

For the most from hydraulic power, consult Hannifin engineers.

Write for Bulletin 35 with complete specifications. Hannifin Manufacturing Company, 621-631 South Kolmar Avenue, Chicago 24, Illinois.

Hannifin

HYDRAULIC CYLINDERS



This
KING
Flange

ACTUALLY SAVES LIVES



In most cases it is difficult to trace directly the use to which a King Ring or Flange is put. That each is used to speed victory, directly or indirectly, we know. That is constant incentive to keep turning out standard shapes and sizes, special shapes and sizes from 288 varieties of bar stock.

In this particular case, however, we know the King Flange becomes a tight-fitting gasket for equipment which produces penicillin. It's the horse-shoe nail story all over again and King is proud to have a part—no matter how small—in saving lives.

KING FIFTH WHEEL COMPANY



2917 N. SECOND STREET, PHILADELPHIA 33, PA.

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200.00 per Net Ton

Steel (Butt Weld)

| | Black | Galv. |
|-----------------|--------|--------|
| 1/2 in. | 63 1/2 | 51 |
| 3/4 in. | 66 1/2 | 55 |
| 1 to 3 in. | 68 1/2 | 57 1/2 |

Wrought Iron (Butt Weld)

| | | |
|----------------------|--------|--------|
| 1/2 in. | 24 | 3 1/2 |
| 3/4 in. | 30 | 10 |
| 1 and 1 1/2 in. | 34 | 16 |
| 1 1/2 in. | 38 | 18 1/2 |
| 2 in. | 37 1/2 | 18 |

Steel (Lap Weld)

| | | |
|--------------------------|----|--------|
| 2 in. | 61 | 49 1/2 |
| 2 1/2 in. and 3 in. | 64 | 52 1/2 |
| 3 1/2 to 6 in. | 66 | 54 1/2 |

Wrought Iron (Lap Weld)

| | | |
|-------------------------|--------|--------|
| 2 in. | 30 1/2 | 12 |
| 2 1/2 to 3 1/2 in. | 31 1/2 | 14 1/2 |
| 4 in. | 33 1/2 | 18 |
| 4 1/2 to 8 in. | 32 1/2 | 17 |

Steel (Butt, extra strong, plain ends)

| | | |
|-----------------|--------|--------|
| 1/2 in. | 61 1/2 | 50 1/2 |
| 3/4 in. | 65 1/2 | 54 1/2 |
| 1 to 3 in. | 67 | 57 |

Wrought Iron (Same as Above)

| | | |
|-----------------|----|--------|
| 1/2 in. | 25 | 6 |
| 3/4 in. | 31 | 12 |
| 1 to 2 in. | 38 | 19 1/2 |

Steel (Lap, extra strong, plain ends)

| | | |
|----------------------|--------|--------|
| 2 in. | 59 | 48 1/2 |
| 2 1/2 and 3 in. | 63 | 52 1/2 |
| 3 1/2 to 6 in. | 66 1/2 | 56 |

Wrought Iron (Same as Above)

| | | |
|---------------------|--------|--------|
| 2 in. | 33 1/2 | 15 1/2 |
| 2 1/2 to 4 in. | 39 | 22 1/2 |
| 4 1/2 to 6 in. | 37 1/2 | 21 |

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

| | Per Net Ton |
|--|-------------|
| 6-in. and larger, del'd Chicago.... | \$54.80 |
| 6-in. and larger, del'd New York... | 52.20 |
| 6 in. and larger, Birmingham | 46.00 |
| 6-in. and larger f.o.b. cars, San Francisco or Los Angeles | 69.40 |
| 6-in. and larger f.o.b. cars, Seattle. 71.20 | |
| Class "A" and gas pipe, \$ extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates. | |

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

| | Seamless | Lap Weld, Cold | Hot | Hot |
|--|----------|----------------|-----|-----|
| | Drawn | Hot | Hot | Hot |
| 2 in. o.d. 13 B.W.G. 15.03 | 13.04 | 12.33 | | |
| 2 1/2 in. o.d. 12 B.W.G. 20.21 | 17.54 | 16.53 | | |
| 3 in. o.d. 12 B.W.G. 22.48 | 19.50 | 18.35 | | |
| 3 1/2 in. o.d. 11 B.W.G. 28.37 | 24.62 | 23.15 | | |
| 4 in. o.d. 10 B.W.G. 35.20 | 30.54 | 28.66 | | |
| (Extras for less carload quantities) | | | | |
| 40,000 lb. or ft. and over | Base | | | |
| 30,000 lb. or ft. to 39,999 lb. or ft. 5% | | | | |
| 20,000 lb. or ft. to 29,999 lb. or ft. 10% | | | | |
| 10,000 lb. or ft. to 19,999 lb. or ft. 20% | | | | |
| 5,000 lb. or ft. to 9,999 lb. or ft. 30% | | | | |
| 2,000 lb. or ft. to 4,999 lb. or ft. 45% | | | | |
| Under 2,000 lb. or ft. | 65% | | | |

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

| | Basing Points Named | Coast Basing Points |
|---------------------------|---------------------|---------------------|
| | Base per Keg | |
| Standard wire nails.... | \$2.80 | \$3.30 |
| Coated nails | 2.80 | 3.30 |
| Cut nails, carloads | 3.85 | .... |
| | Base per 100 lb. | |
| Annealed fence wire.... | \$3.05 | \$3.55 |
| Annealed galv. fence wire | 3.40 | 3.90 |
| | Base Column | |
| Woven wire fence* ... | .67 | .35 |
| Fence posts, carloads... | .69 | .86 |
| Single loop bale ties... | .59 | .84 |
| Galvanized barbed wire** | .70 | .80 |
| Twisted barless wire.. | .76 | .... |

*15 1/2 gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

| | Per Cent Off List |
|---|-------------------|
| 1/2 in. & smaller x 6 in. & shorter.... | 65 1/2 |
| 3/16 & 1/2 in. x 6 in. & shorter..... | 63 1/2 |
| 3/4 to 1 in. x 6 in. shorter..... | 61 |
| 1 1/2 in. and larger, all lengths..... | 59 |
| All diameters over 6 in. long..... | 59 |
| Lag, all sizes | 62 |
| Plow bolts | 65 |

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

| | |
|-----------------------------------|----|
| 1/2 in. and smaller | 62 |
| 3/16 to 1 in. inclusive..... | 59 |
| 1 1/4 to 1 1/2 in. inclusive..... | 57 |
| 1 1/2 in. and larger | 56 |

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts

U.S.S. S.A.E.

Base discount less keg lots

| | |
|----------------------------------|----|
| 7/16 in. and smaller..... | 64 |
| 1/2 in. and smaller | 62 |
| 3/4 in. through 1 in. | 60 |
| 1 1/16 in. through 1 in. | 59 |
| 1 1/8 in. through 1 1/2 in. | 57 |
| 1 1/4 in. and larger..... | 56 |

In full keg lots, 10 per cent additional discount.

Stove Bolts

Consumer

| | |
|--------------------------------------|-----------|
| Packages, nuts loose | 71 and 10 |
| In packages, with nuts attached..... | 71 |
| In bulk | 80 |

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

| | |
|---|--------|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | \$3.75 |
|---|--------|

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

| | |
|---|----------|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 65 and 5 |
|---|----------|

Cap and Set Screws

Consumer

Per Cent Off List

| | |
|--|----|
| Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. | 64 |
| Upset set screws, cup and oval points | 71 |
| Milled studs | 46 |
| Flat head cap screws, listed sizes.... | 36 |
| Phillips head cap, listed sizes..... | 51 |

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

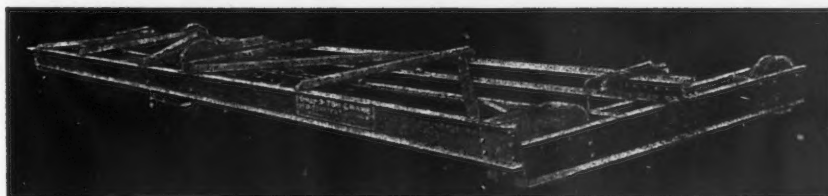
(F.o.b. Pittsburgh, 112 Sheets)

| | 20x14 in. | 20x28 in. |
|------------------------|-----------|-----------|
| 8-lb. coating I.C.... | \$6.00 | \$12.00 |
| 15-lb. coating I.C.... | 7.00 | 14.00 |
| 30-lb. coating I.C.... | 7.50 | 15.00 |

CONCO

3-Motor Single Girder
CAB OR FLOOR
OPERATED

ELECTRIC CRANE ...



Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Head-room Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — \$139.50, 500 lb. — \$149.50, 1000 lb. — \$159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.



CONCO ENGINEERING WORKS
Div. of H. D. Conkey & Co. — 16 Grove St. — Mendota, Ill.
Builders Of Conco Torpedo Electric Hoist

PERFORATED METALS



Any Metal

Any Perforation

For INDUSTRIAL purposes a great variety of sizes and shapes of perforations are required, ranging from very fine to as large as 6" or more in diameter. We are equipped to supply all standard perforations in all kinds and thicknesses of metals.

ORNAMENTAL patterns are covered by our grille catalog. If interested, we hope you will send for it. There are attractive patterns for different uses.

INDUSTRIAL

The **Harrington & King**
PERFORATING CO.

5667 FILLMORE ST., CHICAGO 44 • EASTERN OFFICE: 114 LIBERTY ST., NEW YORK 6, N. Y.

PRICES

PIG IRON

All prices set in bold face type are maximums established by OPA as of February 14, 1945. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.

| | No. 2 Foundry | Basic | Bessemer | Malleable | Low Phosphorus | Charcoal |
|---------------------------|---------------|---------|----------|-----------|----------------|----------|
| Boston..... | \$26.50 | \$26.00 | \$27.50 | \$27.00 | | |
| Brooklyn..... | 28.50 | 28.00 | | 29.00 | | |
| Jersey City..... | 27.53 | 27.03 | 28.53 | 28.03 | | |
| Philadelphia..... | 26.84 | 26.34 | 27.84 | 27.34 | \$31.74 | |
| Bethlehem..... | \$26.00 | \$25.50 | \$27.00 | \$26.50 | | |
| Everett, Mass..... | 26.00 | 25.50 | 27.00 | 26.50 | | |
| Swedeland, Pa..... | 26.00 | 25.50 | 27.00 | 26.50 | | |
| Steelton, Pa..... | | 25.50 | | | \$30.50 | |
| Birdsboro, Pa..... | 26.03 | 25.50 | 27.00 | 26.50 | 30.50 | |
| Sparrows Point, Md..... | 26.00 | 25.50 | | | | |
| Erie, Pa..... | 25.00 | 24.50 | 26.00 | 25.50 | | |
| Neville Island, Pa..... | 25.00 | 24.50 | 25.50 | 25.00 | | |
| Sharpsville, Pa. (1)..... | 25.00 | 24.50 | 25.50 | 25.00 | | |
| Buffalo..... | 25.00 | 24.00 | 26.00 | 25.50 | 30.50 | |
| Cincinnati, Ohio..... | 26.11 | 25.61 | | 26.11 | | |
| Canton, Ohio..... | 26.39 | 25.89 | 26.89 | 26.39 | 33.69 | |
| Mansfield, Ohio..... | 26.94 | 26.44 | 27.44 | 26.94 | 33.86 | |
| St. Louis..... | 25.50 | 25.50 | | | | |
| Chicago..... | 25.00 | 24.50 | 25.50 | 25.00 | 36.46 | \$37.34 |
| Granite City, Ill..... | 25.00 | 24.50 | 25.50 | 25.00 | | |
| Cleveland..... | 25.00 | 24.50 | 25.50 | 25.00 | 33.42 | |
| Hamilton, Ohio..... | 25.00 | 24.50 | 25.50 | 25.00 | | |
| Toledo..... | 25.00 | 24.50 | 25.50 | 25.00 | 33.42 | |
| Youngstown..... | 25.00 | 24.50 | 25.50 | 25.00 | | |
| Detroit..... | 25.00 | 24.50 | 25.50 | 25.00 | | |
| Lake Superior, fc..... | | | | | 34.00 | |
| Lyles, Tenn, fc. (2)..... | | | | | 33.00 | |
| St. Paul..... | 27.63 | 27.13 | 28.10 | 27.63 | 40.80 | |
| Duluth..... | 25.50 | 25.00 | 26.00 | 25.50 | | |
| Birmingham..... | 21.38 | 20.00 | 26.00 | | | |
| Los Angeles..... | 27.95 | | | | | |
| San Francisco..... | 27.95 | | | | | |
| Seattle..... | 27.95 | | | | | |
| Provo, Utah..... | 23.00 | 22.50 | | | | |
| Montreal..... | 28.50 | 28.50 | | 29.00 | | |
| Toronto..... | 26.50 | 26.50 | | 27.00 | | |

GRAY FORGE IRON: Valley or Pittsburgh furnace..... \$24.50

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for \$28.50 at the furnace.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

| | |
|---|---------------------|
| Copper, electrolytic, 150 and 300 mesh..... | 21 1/2 to 23 1/2 c. |
| Copper, reduced, 150 and 200 mesh..... | 20 1/2 to 25 1/2 c. |
| Iron, commercial, 100 and 200 mesh 96 + % Fe..... | 13 1/2 to 15 c. |
| Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots..... | 4 c. |
| Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots..... | 63 c. |
| Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33 c. | |
| Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... | 42 c. |
| Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe..... | 90 c. |
| Aluminum, 100 and 200 mesh..... | 23 to 27 c. |
| Antimony, 100 mesh..... | 20.6 c. |
| Cadmium, 100 mesh..... | \$1 |
| Chromium, 150 mesh..... | \$1.03 |
| Lead, 100, 200 & 300 mesh..... | 11 1/2 to 12 1/2 c. |
| Manganese, 150 mesh..... | 61 c. |
| Nickel, 150 mesh..... | 51 1/2 c. |
| Solder powder, 100 mesh..... | 8 1/2 c. plus metal |
| Tin, 100 mesh..... | 58 1/2 c. |
| Tungsten metal powder, 98%-99%, any quantity, per lb..... | \$2.60 |
| Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb..... | \$2.60 |
| Under 100 lb..... | \$3.00 |

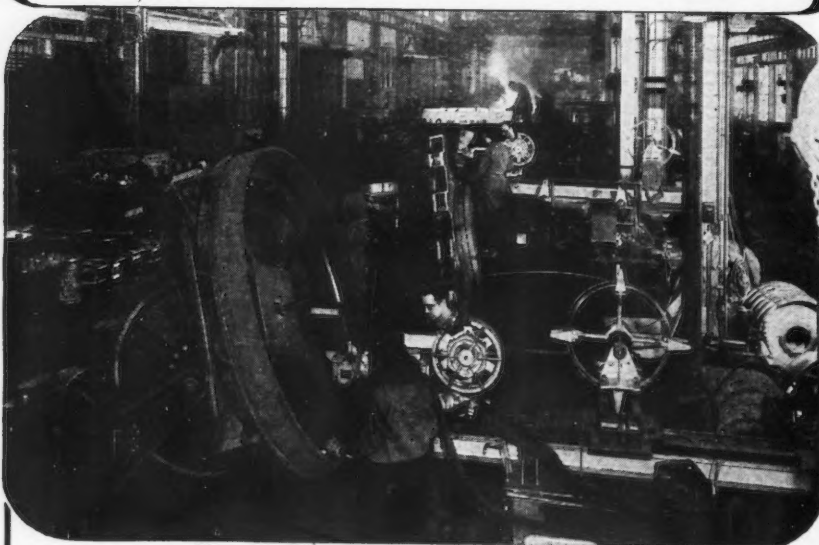
*Freight allowed east of Mississippi.

COKE

| Furnace, beehive (f.o.b. oven) | Net Ton |
|--------------------------------|---------|
| Connellsville, Pa..... | \$7.00* |
| Foundry, beehive (f.o.b. oven) | |
| Fayette Co., W. Va..... | 8.10 |
| Connellsville, Pa..... | 8.25 |
| Foundry, By-Product | |
| Chicago, del'd..... | 13.35 |
| Chicago, f.o.b..... | 12.60 |
| New England, del'd..... | 14.25 |
| Kearny, N. J., f.o.b..... | 12.65 |
| Philadelphia, del'd..... | 12.88 |
| Buffalo, del'd..... | 13.00 |
| Portsmouth, Ohio, f.o.b..... | 11.10 |
| Painesville, Ohio, f.o.b..... | 11.75 |
| Erie, del'd..... | 12.75 |
| Cleveland, del'd..... | 12.80 |
| Cincinnati, del'd..... | 12.85 |
| St. Louis, del'd..... | 13.85 |
| Birmingham, del'd..... | 10.50 |

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.

C-F POSITIONERS



Production Welding will be automatic — on C-F Positioners



Wartime advancement in automatic welding makes certain its wide use as a standard production method in postwar manufacturing. As now, much of it will be done on C-F Positioners, because: (1st) They permit a down hand weld on all sides with but one set-up—rotate 360° tilt to 135° beyond horizontal under push button control. (2nd) The exclusive C-F variable-speed drive which will give table rotational speeds from 0 r.p.m. up. (3rd) C-F positioners come in sizes and capacities for every weldment—are universal tools equally efficient for job work or the production line.

Write for Bulletin WP-22

CULLEN-FRIESTEDT CO.

1303 S. Kilbourn Ave
Chicago 23, Ill.

PRICES

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

| | Per 1000 |
|---|----------|
| Super-duty brick, St. Louis | \$66.55 |
| First quality, Pa., Md., Ky., Mo., Ill. | 52.85 |
| First quality, New Jersey | 57.70 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 47.95 |
| Sec. quality, New Jersey | 52.55 |
| No. 1 Ohio | 44.30 |
| Ground fire clay, net ton | 7.80 |

Silica Brick

| | |
|----------------------------------|---------|
| Pennsylvania and Birmingham | \$52.85 |
| Chicago District | 60.65 |
| Silica cement, net ton (Eastern) | 9.25 |

Chrome Brick

| | Per Net Ton |
|-----------------------------------|-------------|
| Standard chemically bonded, Balt. | |
| Plymouth Meeting, Chester | \$54.00 |

Magnesite Brick

| | |
|------------------------------|---------|
| Standard, Balt. and Chester | \$76.00 |
| Chemically bonded, Baltimore | 65.00 |

Grain Magnesite

| | |
|------------------------------------|---------|
| Domestic, f.o.b. Balt. and Chester | |
| In sacks (carloads) | \$43.48 |
| Domestic, f.o.b. Chewelah, Wash. | |
| (in bulk) | 22.00 |

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

| | |
|---|---------|
| Standard rails, heavier than 60 lb. | |
| No. 1 O.H., gross ton | \$43.00 |
| Angle splice bars, 100 lb. | 2.70 |
| (F.o.b. Basing Points) | |
| Light rails (from billets) | \$43.00 |
| Light rails (from rail steel) | 39.00 |
| Base per Lb. | |
| Cut spikes | 3.00c. |
| Screw spikes | 5.15c. |
| Tie plate, steel | 2.15c. |
| Tie plates, Pacific Coast | 2.30c. |
| Track bolts | 4.75c. |
| Track bolts, heat treated, to rail- | |
| roads | 5.00c. |
| Track bolts, jobbers discount | 63-5 |
| Basing points, light rails, Pittsburgh, | |
| Chicago, Birmingham; cut spikes and tie | |
| plates—Pittsburgh, Chicago, Portsmouth, | |
| Ohio, Weirton, W. Va., St. Louis, Kansas | |
| City, Minnequa, Colo., Birmingham and | |
| Pacific Coast ports; tie plates alone— | |
| Steelton, Pa., Buffalo. Cut spikes alone— | |
| Youngstown, Lebanon, Pa., Richmond, | |
| Oregon and Washington ports, add 25c. | |

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

| | No. 304 | No. 302 |
|-------------------|---------|---------|
| Forging billets | 21.25c. | 20.40c. |
| Bars | 25.00c. | 24.00c. |
| Plates | 29.00c. | 27.00c. |
| Structural shapes | 25.00c. | 24.00c. |
| Sheets | 36.00c. | 34.00c. |
| Hot rolled strip | 23.50c. | 21.50c. |
| Cold rolled strip | 30.00c. | 28.00c. |
| Drawn wire | 25.00c. | 24.00c. |

Straight-Chromium Alloys

| | No. 410 | No. 439 | No. 442 | No. 446 |
|------------|----------|---------|----------|----------|
| F.Billets | 15.725c. | 16.15c. | 19.125c. | 23.375c. |
| Bars | 18.50c. | 19.00c. | 22.50c. | 27.50c. |
| Plates | 21.50c. | 22.00c. | 25.50c. | 30.50c. |
| Sheets | 26.50c. | 29.00c. | 32.50c. | 36.50c. |
| Hot strip | 17.00c. | 17.50c. | 24.00c. | 35.00c. |
| Cold strip | 22.00c. | 22.50c. | 32.00c. | 52.00c. |

Chromium-Nickel Clad Steel (20%)

| | No. 304 |
|--------|----------|
| Plates | 18.00c.* |
| Sheets | 19.00c. |

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

| | Per Lb. |
|--|---------|
| Field grade | 3.20c. |
| Armature | 3.55c. |
| Electrical | 4.05c. |
| Motor | 4.95c. |
| Dynamo | 5.65c. |
| Transformer 72 | 6.15c. |
| Transformer 65 | 7.15c. |
| Transformer 58 | 7.65c. |
| Transformer 52 | 8.45c. |
| F.o.b. Granite City, add 10c. per 100 | |
| lb. on field grade to and including | |
| dynamo. Pacific ports add 75c. per 100 | |
| lb. on all grades. | |

A.I.S.I. HY-TEN S.A.E. N.E.

ALLOY STEELS FOR VICTORY

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

WHEELOCK, LOVEJOY & CO., INC.

126 Sidney Street

Cambridge 39, Mass.

Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 32

Fast Tough

Heavy feed at high speed!

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively unbreakable under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

The same exclusive unbreakable feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from 3/8" to 4 1/2" diameter in stock up to 1 1/2" thick. Usable in portable drill, drill press, or lathe tail stock.

Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U. S. A.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
 Carload lots (bulk) \$135.00
 Carload lots (packed) 141.00
 Less ton lots (packed) 148.50
 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.
 96-98% Mn, 2% max. C, 1% max. Si, 2% max. Fe.
 Carload, bulk 36c.
 L.c.l. lots 38c.
 95-97% Mn, 2% max. C, 1.5% max. Si, 2.5% max. Fe.
 Carload, bulk 34c.
 L.c.l. lots 35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Carloads \$35.00 \$36.00
 Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

| | Eastern Zone | Central Zone | Western Zone |
|------------|--------------|--------------|--------------|
| 50% Si ... | 6.55c. | 7.10c. | 7.25c. |
| 75% Si ... | 8.05c. | 8.20c. | 8.75c. |
| 80-90% Si | 8.90c. | 9.05c. | 9.55c. |
| 90-95% Si | 11.05c. | 11.20c. | 11.65c. |

Spot sales add: 45c. per lb. for 50% Si, 3c. per lb. for 75% Si, 25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 \$4)
 F.o.b. Jackson, Ohio \$30.50
 Buffalo 31.75
 For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| 96% Si, 2% Fe | 13.10c. | 13.55c. | 16.50c. |
| 97% Si, 1% Fe | 13.45c. | 13.90c. | 16.80c. |

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|------------------|--------------|--------------|--------------|
| Carload, bulk | 3.35c. | 3.50c. | 3.65c. |
| 2000 lb.-carload | 3.8c. | 4.2c. | 4.25c. |

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

| | Eastern Zone | Central Zone | Western Zone |
|--|--------------|--------------|--------------|
| Carload, bulk | 6.05c. | 6.70c. | 6.90c. |
| 2000 lb. to carload | 6.90c. | 6.90c. | 6.90c. |
| Under 2000 lb. | 6.90c. | 6.90c. | 6.90c. |
| Briquets, contract, basis carlots, bulk freight allowed, per lb. | 5.80c. | 6.30c. | 6.30c. |
| 2000 lb. to carload | 6.30c. | 6.30c. | 6.30c. |
| Less ton lots | 6.55c. | 6.55c. | 6.55c. |

Ferrochrome

(66-72% Cr, 2% max. Si)
 OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|-----------|--------------|--------------|--------------|
| 0.06% C | 23.00c. | 23.40c. | 24.00c. |
| 0.10% C | 22.50c. | 22.90c. | 23.50c. |
| 0.15% C | 22.00c. | 22.40c. | 23.00c. |
| 0.20% C | 21.50c. | 21.90c. | 22.50c. |
| 0.50% C | 21.00c. | 21.40c. | 22.00c. |
| 1.00% C | 20.50c. | 20.90c. | 21.50c. |
| 2.00% C | 19.50c. | 19.90c. | 21.00c. |
| 66-71% Cr | | | |
| 4-10% C | 13.00c. | 13.40c. | 14.00c. |
| 62-66% Cr | | | |
| 5-7% C | 13.50c. | 13.90c. | 14.50c. |

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

| | Carloads | Ton Bulk | Less Ton |
|-------------------------------|----------|----------|----------|
| 0.10% max. C, 1 or 2% max. Si | 23.00c. | 23.40c. | 23.65c. |
| 0.15% max. C, 1 or 2% max. Si | 22.00c. | 22.40c. | 22.65c. |
| 0.30% max. C, 1 or 2% max. Si | 21.00c. | 21.40c. | 21.65c. |
| 0.50% max. C, 1 or 2% max. Si | 20.00c. | 20.40c. | 20.65c. |
| 0.75% max. C, 7.00% max. Si | 16.00c. | 16.40c. | 16.65c. |

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Carload, bulk | 8.25c. | 8.55c. | 8.95c. |
| Ton lots | 8.75c. | 9.25c. | 10.75c. |
| Less ton lots | 9.00c. | 9.50c. | 11.00c. |

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Carload, bulk | 6.95c. | 6.30c. | 6.50c. |
| Carload, bulk | 6.95c. | 6.30c. | 6.50c. |
| Ton lots | 6.65c. | 7.55c. | 8.55c. |
| Less ton lots | 6.80c. | 7.80c. | 8.80c. |

Calcium-Manganese-Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.
 16-20% Ca, 14-18% Mn, 53-59% Si.
 Add 0.25c. for spot sales.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Carloads | 15.50c. | 16.00c. | 18.05c. |
| Ton lots | 16.50c. | 17.35c. | 19.10c. |
| Less ton lots | 17.00c. | 17.35c. | 19.60c. |

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

| | Cast | Turnings | Distilled |
|---------------|--------|----------|-----------|
| Ton lots | \$1.80 | \$2.30 | \$5.00 |
| Less ton lots | 2.30 | 2.80 | 5.75 |

Chromium-Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.
 Shot or ingot 45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Ton lots | \$1.20 | \$1.3075 | \$1.229 |
| Less ton lots | 1.30 | 1.3075 | 1.329 |

Manganese-Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales. 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

| | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Ton lots | \$1.89 | \$1.903 | \$1.935 |
| Less ton lots | 2.01 | 2.023 | 2.055 |

Nickel-Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.
 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

| | Eastern Zone | Central Zone | Western Zone |
|--------------------|--------------|--------------|--------------|
| 11,200 lb. or more | \$1.90 | \$1.9125 | \$1.9445 |
| Ton lots | 2.00 | 2.09125 | 2.0445 |
| Less ton lots | 2.10 | 2.1125 | 2.1445 |

Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more. \$1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.
 Open hearth \$2.70
 Crucible \$2.80
 Primos \$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal. \$1.50

Vanadium pentoxide, 88%-92% V₂O₅ technical grade, contract basis, any quantity, per lb. contained V₂O₅. Spot sales add 5c. per lb. contained V₂O₅. \$1.10

Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)
 Carload lots 25c.
 2000 lb. to carload 26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)
 Carload lots 58c.
 2000 lb. to carload 59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis
 No. 1 87.5c.
 No. 6 60c.
 No. 79 45c.

Borfram, f.o.b. Niagara Falls
 Ton lots, per lb. 45c.
 Less ton lots, per lb. 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.
 2000 lb. lots \$2.25
 Under 2000 lb. lots \$2.30

Ferrotitanium, 40%-45%, 0.10% C, max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti. \$1.23
 Less ton lots \$1.25

Ferrotitanium, 20%-25%, 0.10% C, max., ton lots, per lb. contained titanium \$1.35
 Less ton lots \$1.40

High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload. \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton. \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglio), Tenn., \$3 unitage freight equalized with Nashville, per gross ton \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.

Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. 80c.

Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo. 80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo. 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 4c. for spot sales.
 Carload lots 14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy
 Carload, bulk 4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk 5.75c.
 Ton lots 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.
 Car lots 8.00c.
 Ton lots 8.75c.
 Less ton lots 9.25c.